HPV Controversy | Medicines from Herbs | Inside Scientology | Hume vs. Rosseau | The Holy Mandylion

Skeptical Inquirer

THE MAGAZINE FOR SCIENCE AND REASON

Vol. 36 No. 1 | January/February 2012

MEASURING MYTHOLOGY

Startling Concepts in NCCAM Grants

Fabricating History, Part Three: Real Messages in DNA

Humor in Paranormal Discourse

Testing Power Balance Bracelets

Mysterious Meteorite of Chalk Mountain

Information Literacy and Conspiracy Theories

INTRODUCTORY PRICE U.S. and Canada $4.95

0 71486 02614 3 02

Published by the Committee for Skeptical Inquiry

Committee for Skeptical Inquiry

AT THE CENTER FOR INQUIRY—TRANSNATIONAL

An International Organization

Paul Kurtz, Founder
Richard Schroeder, Chairman
Ronald A. Lindsay, President and CEO
Barry Karr, Executive Director

Joe Nickell, Senior Research Fellow
Massimo Polidoro, Research Fellow
Benjamin Radford, Research Fellow
Richard Wiseman, Research Fellow

www.csicop.org

Fellows

James E. Alcock*, psychologist, York Univ., Toronto
Marcia Angell, MD, former editor-in-chief, *New England Journal of Medicine*
Kimball Atwood IV, MD, physician; author; Newton, MA
Stephen Barrett, MD, psychiatrist; author; consumer advocate, Allentown, PA
Willem Betz, MD, professor of medicine, Univ. of Brussels
Irving Biederman, psychologist, Univ. of Southern CA
Sandra Blakeslee, science writer; author; *New York Times* science correspondent
Susan Blackmore, visiting lecturer, Univ. of the West of England, Bristol
Mark Boslough, physicist, Sandia National Laboratories, Albuquerque, NM
Henri Broch, physicist, Univ. of Nice, France
Jan Harold Brunvand, folklorist; professor emeritus of English, Univ. of Utah
Mario Bunge, philosopher, McGill Univ., Montreal
Robert T. Carroll, emeritus professor of philosophy, Sacramento City College; writer
Sean B. Carroll, molecular geneticist; vice president for science education, Howard Hughes Medical Institute, Madison, WI
Thomas R. Casten, energy expert; founder and chairman, Recycled Energy Development, Westmont, IL
John R. Cole, anthropologist; editor, National Center for Science Education
K.C. Cole, science writer; author; professor, Univ. of Southern California's Annenberg School of Journalism
Frederick Crews, literary and cultural critic; professor emeritus of English, Univ. of CA, Berkeley
Richard Dawkins, zoologist, Oxford Univ.
Geoffrey Dean, technical editor, Perth, Australia
Cornelis de Jager, professor of astrophysics, Univ. of Utrecht, the Netherlands
Daniel C. Dennett, Austin B. Fletcher Professor of Philosophy and director of Center for Cognitive Studies, Tufts Univ.
Ann Druyan, writer and producer; CEO, Cosmos Studios, Ithaca, NY
Sanal Edamaruku, president, Indian Rationalist Association and Rationalist International
Edzard Ernst, professor, Complementary Medicine, Peninsula Medical School, Universities of Exeter and Plymouth, Exeter, UK
Kenneth Feder, professor of anthropology, Central Connecticut State Univ.
Barbara Forrest, professor of philosophy, SE Louisiana Univ.
Andrew Fraknoi, astronomer, Foothill College, Los Altos Hills, CA
Kendrick Frazier*, science writer; editor, SKEPTICAL INQUIRER
Christopher C. French, professor, Department of Psychology, and head of the Anomalistic Psychology Research Unit, Goldsmiths College, Univ. of London
Yves Galifret, executive secretary, l'Union Rationaliste
Luigi Garlaschelli, chemist, Università di Pavia (Italy); research fellow of CICAP, the Italian skeptics group
Maryanne Garry, professor, School of Psychology, Victoria Univ. of Wellington, New Zealand
Murray Gell-Mann, professor of physics, Santa Fe Institute; Nobel laureate
Thomas Gilovich, psychologist, Cornell Univ.
Wendy M. Grossman, writer; founder and first editor, *The Skeptic* magazine (UK)
Susan Haack, Cooper Senior Scholar in Arts and Sciences, professor of philosophy and professor of Law, Univ. of Miami
Harriet Hall, MD, family physician; investigator, Puyallup, WA
C.E.M. Hansel, psychologist, Univ. of Wales
David J. Helfand, professor of astronomy, Columbia Univ.
Douglas R. Hofstadter, professor of human understanding and cognitive science, Indiana Univ.
Gerald Holton, Mallinckrodt Professor of Physics and professor of history of science, Harvard Univ.
Ray Hyman*, psychologist, Univ. of Oregon
Leon Jaroff, sciences editor emeritus, *Time*
Stuart D. Jordan, NASA astrophysicist emeritus; science advisor to Center for Inquiry Office of Public Policy, Washington, DC
Sergei Kapitza, former editor, Russian edition, *Scientific American*
Barry Karr, executive director, Committee for Skeptical Inquiry, Amherst, New York
Lawrence M. Krauss, foundation professor, School of Earth and Space Exploration and Physics Dept.; director, Origins Initiative, Arizona State Univ.
Harry Kroto, professor of chemistry and biochemistry, Florida State Univ.; Nobel laureate
Edwin C. Krupp, astronomer; director, Griffith Observatory, Los Angeles, CA
Paul Kurtz, professor emeritus of philosophy, SUNY at Buffalo
Lawrence Kusche, science writer
Leon Lederman, emeritus director, Fermilab; Nobel laureate in physics
Scott O. Lilienfeld*, psychologist, Emory Univ., Atlanta, GA
Lin Zixin, former editor, *Science and Technology Daily* (China)
Jere Lipps, Museum of Paleontology, Univ. of CA, Berkeley
Elizabeth Loftus*, professor of psychology, Univ. of CA, Irvine
David Marks, psychologist, City Univ., London
Mario Mendez-Acosta, journalist and science writer, Mexico City
Kenneth R. Miller, professor of biology, Brown Univ.
Marvin Minsky, professor of media arts and sciences, M.I.T.
David Morrison, space scientist, NASA Ames Research Center
Richard A. Muller, professor of physics, Univ. of CA, Berkeley
Joe Nickell, senior research fellow, CSI
Jan Willem Nienhuys, mathematician, Waalre, the Netherlands
Lee Nisbet, philosopher, Medaille College
Steven Novella, MD, assistant professor of neurology, Yale Univ. School of Medicine
Bill Nye, science educator and television host, Nye Labs
James E. Oberg, science writer
Irmgard Oepen, professor of medicine (retired), Marburg, Germany
Loren Pankratz, psychologist, Oregon Health Sciences Univ.
Robert L. Park, professor of physics, Univ. of Maryland
Jay M. Pasachoff, Field Memorial Professor of Astronomy and director of the Hopkins Observatory, Williams College
John Paulos, mathematician, Temple Univ.
Massimo Pigliucci, professor of philosophy, City Univ. of New York—Lehman College
Steven Pinker, cognitive scientist, Harvard Univ.
Philip Plait, astronomer; lecturer; writer
Massimo Polidoro, science writer; author; executive director of CICAP, Italy
Anthony R. Pratkanis, professor of psychology, Univ. of California, Santa Cruz
Benjamin Radford, investigator; research fellow, Committee for Skeptical Inquiry
James "The Amazing" Randi, magician; CSICOP founding member; founder, James Randi Educational Foundation
Milton Rosenberg, psychologist, Univ. of Chicago
Wallace Sampson, MD, clinical professor of medicine, Stanford Univ.; editor, *Scientific Review of Alternative Medicine*
Amardeo Sarma*, chairman, GWUP, Germany
Richard Saunders, vice president, Australian Skeptics; educator; investigator; podcaster; Sydney, Australia
Eugenie C. Scott*, physical anthropologist; executive director, National Center for Science Education
Robert Sheaffer, science writer
Elie A. Shneour, biochemist; author; president and research director, Biosystems Research Institute, La Jolla, CA
Seth Shostak, senior astronomer, SETI Institute, Mountain View, CA
Simon Singh, science writer; broadcaster; UK
Dick Smith, film producer; publisher; Terrey Hills, N.S.W., Australia
Keith E. Stanovich, cognitive psychologist; professor of human development and applied psychology, Univ. of Toronto
Robert Steiner, magician; author; El Cerrito, CA
Victor J. Stenger, emeritus professor of physics and astronomy, Univ. of Hawaii; adjunct professor of philosophy, Univ. of CO
Karen Stollznow*, linguist; skeptical investigator; writer; podcaster
Jill Cornell Tarter, astronomer, SETI Institute, Mountain View, CA
Carol Tavris, psychologist and author, Los Angeles, CA
David E. Thomas*, physicist and mathematician, Peralta, NM
Neil deGrasse Tyson, astrophysicist and director, Hayden Planetarium, New York City
Marilyn vos Savant, *Parade* magazine contributing editor
Steven Weinberg, professor of physics and astronomy, Univ. of Texas at Austin; Nobel laureate
E.O. Wilson, Univ. professor emeritus, organismic and evolutionary biology, Harvard Univ.
Richard Wiseman, psychologist, Univ. of Hertfordshire, England
Benjamin Wolozin*, professor, Department of Pharmacology, Boston Univ. School of Medicine
Marvin Zelen, statistician, Harvard Univ.

* Member, CSI Executive Council (Affiliations given for identification only.)

Skeptical Inquirer January/February 2012 | Vol. 36, No. 1

35
Measuring Mythology: Startling Concepts in NCCAM Grants
EUGENIE V. MIELCZAREK and BRIAN D. ENGLER

44
Laughing Goats and Scowling Sheep
Humor in Paranormal Discourse
JONATHAN C. SMITH

48
Civilizations Lost and Found: Fabricating History
Part Three: Real Messages in DNA
DEBORAH A. BOLNICK, KENNETH L. FEDER, BRADLEY T. LEPPER, and TERRY A. BARNHART

52
The Mysterious Meteorite of Chalk Mountain, Texas
MANFRED CUNTZ

55
Information Literacy and Conspiracy Theories
KRISTIN E. HARLEY

COMMENTARY

9
The HPV Vaccine Controversy
SHOBHA S. KRISHNAN

11
Medicines Derived from Herbs
EDZARD ERNST

SPECIAL REPORT

14
Power Balance Bracelets a Bust in Tests
JAMES UNDERDOWN

REVIEWS

Scientology under the Looking Glass 59
WENDY M. GROSSMAN
Inside Scientology: The Story of America's Most Secretive Religion
by Janet Reitman

Turing Test for Human Beings 61
MASSIMO PIGLIUCCI
The Most Human Human: What Talking with Computers Teaches Us about What It Means to Be Alive
by Brian Christian

He Lets Other People Make Up Stories for Him 62
ROBERT SHEAFFER
The Real Men in Black
by Nick Redfern

COLUMNS

FROM THE EDITOR
NCCAM, No. CSIcon, Yes 4

NEWS AND COMMENT
Allegations against 'Psychic' Sally Generate Storm of Bad Publicity for British Psychics/First Case of Spontaneous Human Combustion?/Russians Confirm Existence of Yeti—But for How Long?/iPhony Cures May Have Cost Apple's Steve Jobs His Life 5

INVESTIGATIVE FILES
The Holy Mandylion: A Déjà-view
JOE NICKELL 17

THINKING ABOUT SCIENCE
Hume vs. Rousseau: The Limits of Human Reason
MASSIMO PIGLIUCCI 20

NOTES ON A STRANGE WORLD
The Case of a Weeping Orthodox Icon
MASSIMO POLIDORO 21

PSYCHIC VIBRATIONS
Comet Elenin "Self-Destructs"—Doomsday Postponed Again!
ROBERT SHEAFFER 23

THE SCIENCE OF MEDICINE
In Multiple Sclerosis Treatments, Hope Trumps Reason
STEVEN NOVELLA 26

SCIENCE WATCH
In Vitro Meat: An Imminent Revolution in Food Production?
KENNETH KRAUSE 28

SKEPTICAL INQUIREE
The Bell Witch Mystery
BENJAMIN RADFORD 32

NEW AND NOTABLE 60

LETTERS TO THE EDITOR 63

THE LAST LAUGH 66

NCCAM, No. CSIcon, Yes.

In a 2003 cover article by physician Kimball Atwood IV we described in detail "the ongoing problem" of the National Center for Complementary and Alternative and Medicine (NCCAM) and its funding and promotion of pseudoscience. We return to the subject in this issue with another cover article. Eugenie V. Mielczarek and Brian D. Engler's "Measuring Mythology" summarizes their detailed study examining the last twenty years of NCCAM grant awards. Our authors looked at all the research projects. They found lots of startling concepts—"distance healing," "magnet healing," "energy healing," "Therapeutic Touch," and the like—all funded by the taxpayer with few if any real results. (The paucity of published results is suspicious in itself.) The details provide strong support for their conclusion: "We found no discoveries in alternative medicine that justify the existence of the center; Congress has mandated into the health care bill the tax burden of paying for myths and commercial interests."

It is time to ask how much longer NCCAM should be allowed to give false credibility to sham medicine and spend taxpayers' money for still more research into claimed treatments that are unsupported by scientific knowledge—and as a result bear virtually no hope of any medical or scientific payoff. In these hard economic times, this waste should be of national concern.

* * *

I just got back from CSIcon New Orleans 2011, our new Halloween-weekend conference "dedicated to scientific inquiry and critical thinking." It was a great event. The conference marks a welcome resumption, after an eight-year hiatus, of Committee for Skeptical Inquiry/Skeptical Inquirer conferences (now with our Center for Inquiry as cosponsor) in the proud tradition of the CSICOP conferences we used to have fairly regularly. Executive Director Barry Karr reports that most comments from participants have been "amazingly positive and overwhelmingly enthusiastic." Attendees said they look forward to the next one and will recommend the conference to their friends. My fellow CSI Executive Council members also thought it a big hit: "[an] absolute (and informative) delight"; "this will be a skeptics meeting people will indeed remember"; "a great revival of something that has been missing the last years"; "exceptionally well-organized… wonderful mix of enlightenment and education"; "filled with interesting speakers and unique events"; and "encouraging and inspiring." I wasn't involved in organizing it, so I feel I may here further express my own view: the program content was superb, the presentations well done, the social events great fun, and the overall experience for me memorable.

The social events included a Saturday night parade led by a New Orleans jazz band to a French Quarter bar with a New Orleans funk band and three-quarters of our attendees in costume—some elaborate, some clever (skeptically speaking). As I said in my introductory remarks to the conference, skepticism is not only important, it is fun. We'll have some reports in our next issue.

—Kendrick Frazier

Committee for Skeptical Inquiry
"...promotes scientific inquiry, critical investigation, and the use of reason in examining controversial and extraordinary claims."

Skeptical Inquirer™
THE MAGAZINE FOR SCIENCE AND REASON

EDITOR Kendrick Frazier

EDITORIAL BOARD James E. Alcock, Thomas Casten, Ray Hyman, Scott O. Lilienfeld, Joe Nickell, Amardeo Sarma, Eugenie C. Scott, David E. Thomas, Leonard Tramiel, Benjamin Wolozin

CONSULTING EDITORS Susan J. Blackmore, Kenneth L. Feder, Barry Karr, E. C. Krupp, David F. Marks, Jay M. Pasachoff, Richard Wiseman

CONTRIBUTING EDITORS Austin Dacey, D.J. Grothe, Harriet Hall, Kenneth W. Krause, Chris Mooney, James E. Oberg, Robert Sheaffer, Karen Stollznow

DEPUTY EDITOR Benjamin Radford

MANAGING EDITOR Julia Lavarnway

ART DIRECTOR Christopher Fix

PRODUCTION Paul E. Loynes

ASSISTANT EDITOR Julia Burke

WEB DEVELOPER Jon Childress

WEBMASTER Matthew Licata

PUBLISHER'S REPRESENTATIVE Barry Karr

CORPORATE COUNSEL Steven Fox

BUSINESS MANAGER Patricia Beauchamp

FISCAL OFFICER Paul Paulin

SUBSCRIPTION DATA MANAGER Jacalyn Mohr

STAFF Melissa Braun, Cheryl Catania, Roe Giambrone, Leah Gordon, Anthony Santa Lucia, John Sullivan, Vance Vigrass

COMMUNICATIONS DIRECTOR Michelle Blackley

INQUIRY MEDIA PRODUCTIONS Thomas Flynn

DIRECTOR OF LIBRARIES Timothy S. Binga

The Skeptical Inquirer is the official journal of the Committee for Skeptical Inquiry, an international organization.

The Skeptical Inquirer (ISSN 0194-6730) is published bimonthly by the Committee for Skeptical Inquiry, 3965 Rensch Road, Amherst, NY 14228. Printed in U.S.A. Periodicals postage paid at Buffalo, NY, and at additional mailing offices. Subscription prices: one year (six issues), $35; two years, $60; three years, $84; single issue, $4.95. Canadian and foreign orders: Payment in U.S. funds drawn on a U.S. bank must accompany orders; please add US$10 per year for shipping. Canadian and foreign customers are encouraged to use Visa or MasterCard. Canada Publications Mail Agreement No. 41153509. Return undeliverable Canadian addresses to: IMEX, P.O. Box 4332, Station Rd., Toronto, ON M5W 3J4.

Inquiries from the media and the public about the work of the Committee should be made to Barry Karr, Executive Director, CSI, P.O. Box 703, Amherst, NY 14226-0703. Tel.: 716-636-1425. Fax: 716-636-1733. Email: bkarr@centerforinquiry.net

Manuscripts, letters, books for review, and editorial inquiries should be sent to Kendrick Frazier, Editor, Skeptical Inquirer, 944 Deer Drive NE, Albuquerque, NM 87122. Fax: 505-828-2080. EMAIL: kendrickfrazier@comcast.net. Before submitting any manuscript, please consult our Guide for Authors for styles, reference requirements, and submittal requirements. It is on our website at www.csicop.org/publications/guide.

Or you may send a request to the editor.

Articles, reports, reviews, and letters published in the Skeptical Inquirer represent the views and work of individual authors. Their publication does not necessarily constitute an endorsement by CSI or its members unless so stated.

Copyright ©2011 by the Committee for Skeptical Inquiry. All rights reserved. The Skeptical Inquirer is available on 16mm microfilm, 35mm microfilm, and 105mm microfiche from University Microfilms International and is indexed in the Reader's Guide to Periodical Literature.

Subscriptions and changes of address should be addressed to: Skeptical Inquirer, P.O. Box 703, Amherst, NY 14226-0703. Or call toll-free 1-800-634-1610 (outside the U.S. call 716-636-1425). Old address as well as new are necessary for change of subscriber's address, with six weeks advance notice. Skeptical Inquirer subscribers may not speak on behalf of CSI or the Skeptical Inquirer.

Postmaster: Send changes of address to Skeptical Inquirer, P.O. Box 703, Amherst, NY 14226-0703.

Allegations against 'Psychic' Sally Generate Storm of Bad Publicity for British Psychics

CHRISTOPHER C. FRENCH

Ironically, British psychics didn't see it coming. They have recently been on the receiving end of a veritable storm of negative publicity following allegations that Sally Morgan, who describes herself on her website as "Britain's best-loved psychic," may have been caught using a fraudulent technique to convince her audiences of her mediumistic ability.

The allegations began September 12, 2011, when a caller named Sue phoned into the *Liveline* show on RTÉ Radio 1, an Irish radio station. Sue reported that the previous evening she had been to see Morgan in action at the Grand Canal Theatre in Dublin. She had been seated at the back of the theater on the fourth floor and had initially been impressed by the psychic's performance. However, as the second half of the show started, Sue became aware of a man's voice coming from an open window just behind her, from a small room ("like a projection room"). She realized that whatever the male voice said, Morgan repeated on stage about ten seconds later. An usher at the theater realized what was happening and quietly closed the window. The voice was not heard again. Other callers supported Sue's account (visit http://bit.ly/qDlcuJ to listen to the radio show).

Geoff Swaine/LFI/Photoshot/Newscom

Sue believed that the mystery voice was feeding information to Morgan via a hidden earpiece attached to her microphone headset. She further speculated that this information may well have been gathered from audience members by accomplices of Morgan engaging people in conversation as they queued up before the show began. Given that this is a standard technique used by fraudulent mediums, this is not an unreasonable speculation.

The theater's general manager claimed that the voice heard by Sue and other audience members belonged to two theater employees and was not supplying Morgan with information. Sally Morgan Enterprises also denied that the medium was being fed information during the show.

Most readers of this magazine will immediately spot the similarity between these allegations and the case of Peter Popoff, the fraudulent faith healer exposed by James Randi back in 1986. Popoff claimed that he was receiving information about members of his audience directly from God. In fact, his wife was relaying the information to him via his "hearing aid." At the time, Popoff was fleecing his poor, sick followers to the tune of around $4 million per month. Following his exposure, Popoff went bankrupt in 1987—but he is now back, earning even more than he was in the 1980s.

The allegations relating to Sally Morgan initially received very little coverage. The *Irish Independent* ran the story on September 13 (see http://bit.ly/mPoi5x), but it looked like that would be the only coverage the story would get and most of Morgan's fans would probably never even hear about the allegations. I thought that the story merited wider exposure, so I contacted Ian Sample of the *Guardian* to see if he would like me to write the story for the *Guardian*'s online science pages.

Initially, he wasn't keen on the grounds that he didn't want to give free publicity to psychics. I persuaded Ian by pointing out that I thought it was a good idea to give psychics as much *bad* publicity as we could. My article, posted on September 20, 2011, generated more comments than any other piece I've written for the *Guardian* (www.guardian.co.uk/science/2011/sep/20/psychic-sally-morgan-hears-voices).

I do not have psychic powers, so I make no apology for not foreseeing what would happen next. I tweeted about my article and a few dozen people retweeted it. Others also tweeted about it, including Simon Singh, Richard Wiseman, and James Randi. The media picked up on the story and within four days several British newspapers had already run articles strongly critical of psychics in general and Sally Morgan in particular, including the *Telegraph* (http://tgr.ph/opcWIg), *Express* (http://bit.ly/rpVUyc), and the *Daily Mail* (http://bit.ly/reTW3s). There is a certain irony here, as such newspapers often run stories that are little more than gushing endorsements for the latest psychic superstar.

There has also been a great deal of discussion regarding this case and fraudulent psychics in general on local and national radio. I have personally done several interviews on the topic, as has science writer Simon Singh. I think my favorite moment was listening to Singh challenge none other than Uri Geller to put his powers to the test in our laboratory in order to win Randi's Million Dollar Prize (http://bbc.in/npV4MB). Uri's response? (Sit down, dear reader—this may come as a shock!) He refused.

Most readers of this magazine will immediately spot the similarity between these allegations and the case of Peter Popoff, the fraudulent faith healer exposed by James Randi back in 1986.

On Friday, October 7, 2011, it was announced that Sally Morgan had instructed Atkins Thomson, a London law firm experienced in matters of media law, to "commence libel action in relation [to] various articles in the press." As of the time of this writing (October 23, 2011), it remains unclear against whom any such action would be directed. Indeed, there is some speculation that the announcement was intended as a scare tactic to try to stem the outpouring of bad publicity that has been directed against British psychics in general and Morgan herself in particular. If that was the intention, the tactic appears to have failed. For example, it was subsequently reported that a video on Morgan's own website clearly shows her removing an earpiece as she comes off stage after one of her shows (http://bit.ly/qXAke6).

Simon Singh has published a piece in the *Guardian* explicitly inviting Morgan to resolve the controversy by proving her claims of psychic ability under properly controlled conditions (see http://bit.ly/nUENUg). He is collaborating with Merseyside Skeptics (www.merseysideskeptics.org.uk) and my own Anomalistic Psychology Research Unit (www.gold.ac.uk/apru) to design a suitable test of Morgan's claims. Alternatively, Morgan can work with us to devise a suitably well-controlled protocol that suits her. So far, she has not replied to our invitation. You don't need psychic powers to foresee that the negative publicity for "possibly-not-so-psychic Sally" will continue for quite a while! ■

Christopher C. French is the head of the Anomalistic Psychology Research Unit at Goldsmiths College, University of London. He is a fellow of the Committee for Skeptical Inquiry and editor of *The Skeptic* (United Kingdom).

First Case of Spontaneous Human Combustion?

JOE NICKELL

As reported by BBC News Online (September 23, 2011), an Irish coroner has officially declared a seventy-six-year-old man to have died of "spontaneous combustion."

The body of Michael Faherty of Ballybane, Galway, Ireland, was discovered severely destroyed on December 22, 2010. Faherty's remains were found lying "with his head closest to an open fireplace"—yet, without explaining themselves, firefighters concluded that that obvious source of ignition was not involved.

Galway coroner Ciaran McLoughlin then concluded, apparently using the process of elimination, that the death must have been caused by spontaneous human combustion (SHC) "for which," he says, "there is no adequate explanation." In fact, the coroner's ar-

Russians Confirm Existence of Yeti–But for How Long?

Benjamin Radford

Russian researchers participating in a conference looking for the Yeti—the Asian version of the North American Bigfoot—claimed to have found "indisputable proof" of the long-sought mystery beast in October. The Yeti is said to be muscular and covered with dark grayish or reddish-brown hair and is believed to weigh between 200 and 400 pounds. The Yeti is supposedly relatively short compared to Bigfoot's ten to twelve feet, averaging only about six or seven feet in height. Despite dozens of expeditions into the remote mountain regions of Russia, China, and Nepal, the Yeti's existence remains unproven.

Could the new find be true? This is of course not the first time searchers have claimed strong, or even indisputable, proof of the Yeti. In 2007, American television show host Josh Gates claimed he had found three mysterious footprints in snow near a stream in Nepal's Himalayas. Locals were skeptical, suggesting that he simply misinterpreted a bear track. No follow-up information ever emerged, and the Gates track, once touted internationally as strong evidence of the Yeti, is now largely forgotten.

In 2010 a strange, nearly hairless animal was captured by hunters in the Sichuan province of China. Researchers and news reporters suggested that a Yeti had finally been captured alive, though the proclamation turned out to be premature: embarrassed officials eventually admitted it was nothing more than a mangy civet—a small, cat-like animal native to the region.

So what is this new, indisputable proof? Apparently some gray hairs found in a clump of moss in a Russian cave. According to a spokesman for the Kemerovo region in western Siberia, "During the expedition to the Azasskaya cave, conference participants gathered indisputable proof that the Shoria mountains are inhabited by the 'Snow Man.' They found his footprints, his supposed bed, and various markers . . . which the Yeti uses to denote his territory."

It's not clear why, if the researchers were certain that the Yeti had recently used the cave, they didn't simply set up cameras to record the creature—or wait for it to return to the cave, where it could be trapped and captured alive, offering conclusive proof of the Yeti's existence.

Some Russians view the announcement with considerable suspicion and skepticism, suggesting that the sudden discovery is a publicity stunt to increase tourism in the impoverished coal-mining region. So far it seems to have worked, as hundreds of people have come to tour the cave. In fact, the event seemed more of a media circus than a scientific expedition when former Russian heavyweight boxer Nikolai Valuev recently toured the cave "searching" for the Yeti, to great media attention. All new evidence of Bigfoot and Yeti should be carefully and scientifically analyzed; however, if history is any guide, this latest Yeti discovery will soon fade away, leaving the creature's existence in question.

NARENDRA SHRESTHA/EPA/Newscom

American television channel host and explorer Josh Gates displays an alleged footprint of the mythical snow man "Yeti" at his hotel in Kathmandu, Nepal.

gument is a classic example of faulty logic called "an argument from ignorance": basically, "we don't know, therefore we do know." Certainly, we cannot explain one unknown by invoking another.

Questioned about the case by CBS News's online Health Watch (September 27), I noted that the Irish authorities seem unaware of the scientific research into alleged SHC—not a single case of which has been confirmed by mainstream science. In typical cases victims are impaired by age, infirmity, or drugs and so are more likely to have an accident and are less able to respond effectively to it. A spark dropping from smoking materials or propelled from a fireplace may land on the clothes, smolder, and burst into flame. As the victim succumbs, his clothing may function like a wick, absorbing melted body fat to fuel more burning to destroy still more tissue—a cyclic process known as the Wick Effect. In this manner the body is consumed over time at a relatively low temperature that may have little effect on surroundings.

In researching the purported phenomenon, forensic analyst John F. Fischer and I investigated thirty historic cases and published the results in an arson investigation journal, as well as in my *Secrets of the Supernatural*, 1988, pp. 149–57. (See also my "Not-So-Spontaneous Human Combustion Deaths," SI, November/December 1996, and Mark Benecke's "Spontaneous Human Combustion: Thoughts of a Forensic Biologist," SI, March/April 1998.)

iPhony Cures May Have Cost Apple's Steve Jobs His Life

Gary P. Posner

Quack medical cures posted on the Internet seduced one of the world's greatest visionaries into delaying surgery for a potentially curable disease, possibly costing him his life.

In the recently published *Steve Jobs*, biographer Walter Isaacson unveils many heretofore hidden details surrounding the life and death of the notoriously guarded genius, whose innovative "i" (standing for "Internet") gadgetry has revolutionized the way humanity interacts in work and play.

Jobs's gaunt appearance in 2003 led to much public speculation about his health. It was not until the following year that he underwent surgery to remove a cancerous tumor from his pancreas, and his subsequent liver transplant in 2009 seemed a last-ditch effort to salvage a few additional months or years of life from one of the most uniformly deadly of all diagnoses.

MONICA M. DAVEY/EPA/Newscom

But the type of cancer that Jobs had—an islet cell neuroendocrine tumor—often offers a far more promising prognosis than does the typical pancreatic adenocarcinoma. Whereas the latter almost uniformly leads to death within a year of discovery, Jobs's cell type, which comprises only 5 percent of cases, can carry a greater than 50 percent chance for cure if treated in time. "He was lucky," writes Isaacson, "that it was detected so early—as the by-product of a routine kidney screening—and thus could be surgically removed before it had definitely spread."

Jobs fancied himself a lifelong skeptic—for instance, he abandoned Christianity at age thirteen when his pastor couldn't explain to his satisfaction why God allows famine to claim the lives of innocent children. But his skepticism seems to have been mostly directed toward the conventional rather than the paranormal. As Isaacson puts it, "In the past he had been rewarded for what his wife called his 'magical thinking'—his assumption that he could will things to be as he wanted."

One relatively benign example: Jobs's belief that he needn't bathe more than once per week when adhering to a strict fruit-and-vegetable diet, which he often did even as a teenager. A less benign one: that what Penn Jillette would term "NewAge (rhymes with 'sewage')" therapies might prove as effective as the dreaded knife in ridding his body of cancer. From the book: "Specifically, he kept to a strict vegan diet, with large quantities of fresh carrot and fruit juices. To that regimen he added acupuncture, a variety of herbal remedies, and a few other treatments he found on the Internet or by consulting people around the country, including a psychic."

After such "alternative" therapies failed to magically effect a cure, Jobs finally capitulated to the pleadings of physicians and family that he undergo surgery. His wife described for Isaacson "her husband's doctors tearing up with joy" nine months earlier when the needle biopsy results had unexpectedly offered far more than a mere glimmer of hope that their patient might survive for the long haul. But the hiatus may have provided the window of opportunity for his malignancy to spread—three liver metastases were found. Jobs's ensuing chemotherapy, which worked amazingly well for a time, was uniquely targeted to his tumor cells, thanks to his having "become one of the first twenty people in the world to have all the genes of his cancer tumor as well as of his normal DNA sequenced."

The price tag for that procedure exceeded $100,000, a drop in the bucket for a billionaire. Jobs's magical mystery (de)tour through the world of iPhony cures may have ultimately proven far more costly. ■

Gary Posner, MD, is founder of Tampa Bay Skeptics and a CSI scientific consultant. His website is www.gpposner.com.

The HPV Vaccine Controversy

SHOBHA S. KRISHNAN

Ever since the FDA approved the human papillomavirus (HPV) vaccine in 2006, its introduction has been embroiled in a medical, social, cultural, and political controversy. This controversy has once again been rekindled in the recent Republican primary debates between Texas governor Rick Perry and Congresswoman Michele Bachmann from Minnesota, in which Bachmann emphatically stated that Merck's HPV vaccine, Gardasil, causes mental retardation.

As a physician, parent, and author of the award-winning book *The HPV Vaccine Controversy: Sex, Cancer, God and Politics* (Praeger, 2008), I feel compelled to comment on this issue.

A report presented by four different sources to the Advisory Committee on Immunization Practices (ACIP), an independent panel of experts that advises the Centers for Disease Control and Prevention (CDC) on vaccine policies, found no signals to link Gardasil directly to any of the serious adverse effects that have been publicized in the media.

To clarify this and help consumers make the best-informed decision before vaccinating, it is helpful to understand the difference between a side effect (caused directly by the vaccine) and an adverse effect (which usually occurs within six weeks after the administration of a vaccine but may or may not be related to the vaccine).

1) The most common side effects reported are pain followed by swelling and redness at the site of injection. These temporary symptoms usually resolve within a few days, as is the case with most other vaccines.

2) The number of adverse effects that link the HPV vaccines to the nervous system disorder Guillain–Barré Syndrome is around one to two out of every 100,000 cases—about the same as the number of cases that occur in the general population as a sheer coincidence or chance—and such disorders have the same statistical occurrence as the population at large that has not been vaccinated.

It is obvious that the greater the number of shots administered (as of June 22, 2011, 35 million doses of Gardasil had been distributed), the more likely the chance for these rare and unexpected events to occur. It should be noted that there is no report from the CDC of Gardasil resulting in mental retardation.

The HPV vaccine has established a decent track record at five years post-licensure. Based upon these current findings, the FDA strongly recommends vaccinating the target population: nine- to twenty-six-year-old females and males. The CDC will continue to be vigilant and monitor safety data on an ongoing basis. Nevertheless, it is helpful to remind ourselves that regardless of how well studies are conducted, gray zones of risk exist. The history of medicine has shown us that such unfortunate events do occur for unknown reasons, and research is underway to study if genetics and environmental factors have a role to play in such rare and serious events.

One should always balance the greater good with these potentially minimal risks when evaluating the advantages offered by new and emerging medicines. Scaremongering for personal political gain does not bode well for the education and welfare of the public. In the case of the HPV vaccine, it would be a shame if negative attention created by a few rare effects hampers the efforts to reach millions of women and men who risk losing their lives to HPV–related diseases, including cancers and particularly cervical cancer, both in our country and around the world. ■

Shobha S. Krishnan, MD, is the founder and president of the Global Initiative Against HPV and Cervical Cancer (www.giahc.org). She is author of the international award–winning book *The HPV Vaccine Controversy: Sex, Cancer, God and Politics*. A family physician and gynecologist, she serves on the STD research working group at the Columbia College of Physicians and Surgeons and on the Medical Advisory Board of the National Cervical Cancer Coalition.

"It is error only, and not truth, that shrinks from inquiry."
– Thomas Paine

3 FOR TOMORROW

You Are Invited to Join the Center for Inquiry To **Act, Combat,** and **Promote…**

Since 1976, three remarkable organizations have been at the forefront of efforts to promote and defend critical thinking and freedom of inquiry. The **Committee for Skeptical Inquiry** (founded in 1976), the **Council for Secular Humanism** (1980), and the **Center for Inquiry** (1991) have advocated, championed, and, when necessary, defended the freedom to inquire—while demonstrating how the fruits of objective inquiry can be used to understand reality, refute false beliefs, and achieve results that benefit humanity.

In many ways, our organizations have been ahead of their time. Now, they are truly **3 For Tomorrow**. Through education, advocacy, publishing, legal activism, and their network of regional branches, CFI and its affiliate organizations continue to provide support for everyone who seeks a better life—in this life—for all.

CSI Fellow and SKEPTICAL INQUIRER Editorial Board Member James Alcock leads a class at a Skeptics' Toolbox event. The Toolbox has been held every year, except once, since 1992.

Your Help Is a Necessity!

Each year, magazine subscriptions fund a smaller percentage of this work, even as the need for activism increases and the population we serve grows.

More than ever, CFI and its affiliates depend on the generosity of our supporters both **to fund daily operations** and **to build capital for the future.**

Your support today can protect tomorrow for us all. Your generous gift can perpetuate our work toward the kind of world you—and your grandchildren—can feel proud to live in.

ACT, COMBAT, and PROMOTE

We are currently focused on three goals central to our core objectives:

- **Act to end the stigma attached to being nonreligious.**
- **Combat religion's privileges and its influence on public policy.**
- **Promote science-based skepticism and critical thinking.**

Make your most generous gift today, or request information on planned giving or a bequest.

For more information, return the attached card or contact us at:

Center for Inquiry
Development Office
P.O. Box 741
Amherst, NY 14226
1-800-818-7071
development@centerforinquiry.net
website: www.centerforinquiry.net

Medicines Derived from Herbs

EDZARD ERNST

Herbal medicines are currently quite popular; consumers are spending billions on them each year. Enthusiasts praise them as natural and safe, while skeptics often see them as little more than glorified placebos. The general public is frequently confused by such controversies, by a plethora of misinformation, and by the bewildering categories of medicines derived from herbs (U.S. Government Accountability Office 2010). Here I will try to clear up some of this confusion by explaining what the different categories are.

Herbal Medicines

Herbal medicines are preparations made from whole plants or whole parts of plants. They are also called botanical medicines, remedies, or supplements. Invariably they contain a mixture of ingredients, some of which may be pharmacologically active. Frequently they are marketed as dietary supplements, which are not required to have proven efficacy, safety, or quality in the United States and most other countries (Marcus and Grollman 2002, 347). Thus the spectrum is wide with both high- and low-quality products often placed side by side. Calls for tighter regulation are made regularly (e.g., U.S. Government Accountability Office 2009) but are routinely frustrated.

Herbal medicines are mostly used by consumers for self-treatment of minor symptoms. Doctors rarely employ them (except in some countries, such as Germany) and, crucially, traditional herbalists use an entirely different approach with each treatment.

The majority of herbal medicines have not been scientifically tested. But some have been adequately analyzed, standardized, and submitted to clinical trials (Ernst et al. 2006). St. John's Wort (*Hypericum perforatum*) is perhaps the best-investigated example. We know that this herbal antidepressant has several pharmacologically active ingredients that have been standardized in high-quality products and tested for efficacy and safety in approximately fifty clinical trials and many post-marketing surveillance studies. The results leave little doubt that St. John's Wort is efficacious for mild to moderate depression. It is also relatively safe as long as it is not combined with other drugs (Ernst et al. 2006).

When taken together with other medications, St. John's Wort can powerfully interact such that it lowers the plasma level of many drugs (Izzo and Ernst 2001, 15) which, of course, can have serious consequences. Thus the example of St. John's Wort goes some way toward demonstrating that herbal medicines can do both good *and* harm to patients. In other words, some herbal medicines are complicated pharmacological treatments and are biologically plausible (Schulz and Hänsel 2003).

Many other herbal medicines are not well-researched; therefore we cannot be certain about their risk-benefit profile (Ernst et al. 2006). Even the well-researched examples like St. John's Wort should be approached with healthy

Ten patients suffering from depression may receive ten different, individualized concoctions, none of which might contain St. John's Wort, the only evidence-based herbal antidepressant. In other words, the biological plausibility of traditional herbalism is questionable.

skepticism: the few high-quality products available are outnumbered by supplements of low quality and dubious content. Thus the market of herbal medicines is littered with products that contain little or no herbal ingredients (Sievenpiper et al. 2004, 27), are adulterated with prescription drugs (Miller and Stripp 2007, 9), or are contaminated with heavy metals (Buettner et al. 2009, 24; Cohen 2009, 361).

Synthetic Drugs Derived From Herbs

Many of our modern drugs (e.g., aspirin, Morphium, Tamoxifen, Vincristin, etc.) were originally derived from botanical material. In fact, many skeptics wonder why we cannot also extract and synthesize the active ingredients from well-researched herbal medicines such as St. John's Wort and generate single ingredients derived from that plant. This would clearly solve several problems inherent in herbal medicine, such as standardization.

While this approach of creating pure compounds does work occasionally, it fails in other instances. One reason can be the fact that herbal medicines tend to have not one but a multitude of pharmacologically active ingredients. Thus extracting only one ingredient might reduce the pharmacological activity of the whole plant extract.

Single ingredients derived from herbal extracts can no longer be considered herbal medicines as, by definition, herbal medicines are based on the whole plant. Nevertheless, such drugs are reminders of the fact that many plants contain molecules that are pharmacologically active and can thus have both beneficial and detrimental health effects.

Traditional Herbalism

If a patient consults a Chinese, Indian, Japanese, or European herbalist, he will be diagnosed and treated according to obsolete and untested principles of diagnosis, pathophysiology, and so forth. Treatment will typically be individualized according to the characteristics of each patient and based on complex, tailor-made herbal mixtures of several (up to ten) herbal extracts. This means that ten patients suffering from depression may receive ten different, individualized concoctions, none of which might contain St. John's Wort, the only evidence-based herbal antidepressant. In other words, the biological plausibility of traditional herbalism is questionable.

Traditional herbalism is thus dramatically different from the herbal medicine described above. To scientifically test its value can be complex but it is doubtlessly possible. Few rigorous studies of this approach are currently available, and those that have been published do not support the notion that traditional herbalism is effective (Guo et al. 2007, 83).

Neither can we be certain about its safety. Because the tailor-made concoctions of traditional herbalists may contain a confusing number of active ingredients, the potential for toxicity, herb-drug interaction, contamination, and so on can be considerable. More vigorous regulation of herbalists, a subject currently being discussed in Europe (Hawkes 2010, 339), is therefore required.

Homeopathic Remedies

The public frequently confuses homeopathy with herbal medicine. The error usually arises because many homeopathic remedies are produced from "mother tinctures," which are based on herbal extracts. Thus they can carry the same (or similar) names as herbal products. The difference is that homeopathic remedies are typically highly diluted and therefore contain no active ingredients at all. Thus homeopathy lacks any biological plausibility.

Arnica is a good example. It is used as an herbal cream as well as a homeopathic remedy. Because it is toxic, Arnica should not be taken as an oral herbal medicine. Being highly diluted, homeopathic Arnica is, of course, both nontoxic and entirely ineffective (Ernst and Pittler 1998, 133).

Bach Flower Remedies

These products are currently very popular for self-medication, particularly in Europe. They are produced by placing freshly picked flowers in spring water. Thus they are also plant-derived and frequently confused with herbal medicines. After the flowers have floated for a while, the water is mixed with brandy and sold at high prices as Bach Flower Remedies.

Bach Flower Remedies were developed by the British physician Edward Bach, who had previously worked as a homeopath. His remedies have, however, little in common with homeopathy except, of course, that they are neither biologically plausible nor of proven effectiveness for any condition (Ernst 2010, 140).

Anthroposophical Medicines

Rudolf Steiner developed his anthroposophical medicines about one hundred years ago (Ernst 2008, 150). They are produced according to protocols similar to those of homeopathic remedies. Unlike homeopathy, however, anthroposophical medicine does not follow the "like cures like" principle.

As many anthroposophical medicines are based on plants, they are also often confused with herbal medicines. The best known example is Iscador®, a fermented mistletoe preparation that is a highly popular treatment for cancer in Europe. Numerous trials exist, but collectively their results do not show that this is an effective therapy (Horneber et al. 2008, 16).

Conclusion

Many articles on herbal medicine conclude by stating that more research is needed. Between 1999 and 2007, the National Institutes of Health has spent US $1.9 billion on research into dietary supplements (Regan, Wambogo, and Haggans 2011, 141). Not all of this money was well invested (Ernst et al. 2011). I therefore advocate not necessarily more research but better-designed studies into the few plausibly beneficial aspects of herbal medicine. ■

References

Buettner, C., K.J. Mukamal, P. Gardiner, et al. 2009. Herbal supplement use and blood lead levels of United States adults. *Journal of General Internal Medicine* 24(11): 1175–82.

Cohen, P.A. 2009. American roulette: Contaminated dietary supplements. *New England Journal of Medicine* 361(16): 1523–25.

Ernst, E. 2008. Anthroposophic medicine: A critical analysis [in German]. *MMW Fortschritte der Medizin* 150(Suppl. 1):1–6.

———. 2010. Bach flower remedies: A systematic review of randomised clinical trials. *Swiss Medical Weekly* 140: w13079.

Ernst, E., and M.H. Pittler, 1998. Efficacy of homeopathic arnica: A systematic review of placebo-controlled clinical trials. *Archives of Surgery* 133(11): 1187–90.

Ernst, E., M.H. Pittler, B. Wider, et al. 2006. *The Desktop Guide to Complementary and Alternative Medicine*, 2nd ed. Edinburgh: Elsevier Mosby.

Ernst, E., S.K. Hung, and Y. Clement. 2011. NCCAM-funded RCTs of herbal medicines: An important critical assessment. *Perfusion* 24(3) 89–102.

Guo, R., P.H. Canter, and E. Ernst. 2007. A systematic review of randomised clinical trials of individualised herbal medicine in any indication. *Postgraduate Medical Journal* 83(984): 633–37.

Hawkes, N. 2010. A spanner in the herbal works. *BMJ* 339: b5441.

Horneber, M.A., G. Bueschel, R. Huber, et al. 2008. Mistletoe therapy in oncology. *Cochrane Database Systems Review* 16(2): CD003297.

Izzo, A.A., and E. Ernst. 2001. Interactions between herbal medicines and prescribed drugs: A systematic review. *Drugs* 15: 2163–75.

Marcus, D.M., and A.P. Grollman. 2002. Botanical medicines: The need for new regulations. *New England Journal of Medicine* 347(25): 2073–76.

Miller, G.M., and R. Stripp. 2007. A study of western pharmaceuticals contained within samples of Chinese herbal/patent medicines collected from New York City's Chinatown. *Legal Medicine* 9(5): 258–64.

Regan, K.S., E.A. Wambogo, and C.J. Haggans. 2011. NIH and USDA funding of dietary supplement research, 1999–2007. *Journal of Nutrition* 141(1):1–3.

Schulz, V., and R. Hänsel. 2003. Rational phytotherapie: A physician's guide to herbal medicine, 5th ed. Berlin: Springer-Verlag.

Sievenpiper, J.L., J.T. Arnason, E. Vidgen, et al. 2004. A systematic quantitative analysis of the literature of the high variability in ginseng (Panax spp.): Should ginseng be trusted in diabetes? *Diabetes Care* 27(3): 839–40.

U.S. Government Accountability Office. 2009. Dietary Supplements: FDA Should Take Further Actions to Improve Oversight and Consumer Understanding. United States Accountability Office, January: Report to Congressional Requesters. GAO-09-250. Available online at www.gao.gov/new.items/d09250.pdf.

———. 2010. Herbal Dietary Supplements: Examples of Deceptive or Questionable Marketing Practices and Potentially Dangerous Advice. United States Government Accountability Office, May 26: Testimony Before the Special Commitee on Aging, U.S. Senate. GAO-10-662T. Available online at www.gao.gov/new.items/d10662t.pdf.

Edzard Ernst, MD, PhD, is in the Complementary Medicine unit at Peninsula Medical School, University of Exeter, United Kingdom. He wrote on conflicts of interest in alternative medicine in our July/August 2011 issue.

Power Balance Bracelets a Bust in Tests

Members of the Independent Investigations Group and sixteen volunteers, including former Olympic gymnast Dominique Dawes, conducted a test of Power Balance bracelets. The results will not be surprising to skeptics.

JAMES UNDERDOWN

Power Balance bracelets are silicone wristbands that are embedded with two Mylar holograms (see right). On October 21, 2010, the Independent Investigations Group (IIG) conducted a double-blind test to determine whether Power Balance's claims that the holograms on their bracelets (then selling online for $29.95) work with the body's "energy field" to improve strength, flexibility, and balance by "optimizing the body's natural energy flow." The company's website also included a tangle of information that attempted to draw connections between Eastern medicine, "body frequencies," and "positive energy." The following excerpt, once available on the Power Balance site, gives insight into the company's rationale behind its product: "Most everything has a frequency inherent to it. Some frequencies react positively with your body and others negatively. When the hologram comes in contact with your body's energy field, it allows your body to interact with the natural, beneficial frequency stored within the hologram. This results in improved energy flow throughout your body." (See Harriet Hall's excellent article about these claims, "Power Balance Technology: Pseudoscientific Silliness Suckers Card-Carrying Surfers," in the May/June 2010 SKEPTICAL INQUIRER; also available online at www.csicop.org /si/show/power_balance_technology.) The company relies heavily on testimonials from blue-chip pro athletes like Shaquille O'Neal of the Boston Celtics, Lamar Odom of the Los Angeles Lakers, and Derrick Rose of the Chicago Bulls. Odom and others are paid to endorse the product and do wear the bracelets during games.

Power Balance once used highly subjective applied kinesiology tests to demonstrate that the bracelets work. In these types of "tests," one person analyzes another's resistance and balance by applying pressure in various ways. (The applied kinesiology videos are no longer on Power Balance's website, www.power balance.com.)

The applied kinesiology method of testing the bracelet's effectiveness is problematic and full of flaws for a number of reasons. There is no way to know from videos of these tests how much pressure the tester is exerting, whether the technique used to apply the pressure is identical each time, or whether the resistance from the person being tested is the same each time. Most people's flexibility seems to improve from their first stretch to their second stretch regardless of whether they are wearing the bracelet.

Former Olympic gymnast Dominique Dawes and IIG founder James Underdown.

A volunteer running the test course.

The test was double blinded: neither the test participants nor the testers knew which bracelet was the "real" Power Balance band.

(I invite you to try this for yourself using no bracelet.)

Also, the people being tested may unconsciously change their own resistance when they know the bracelet is on and think it should be helping. Indeed, the psychological effect of *believing* the bracelet will help may be the only real effect Power Balance can claim. Every athlete knows that confidence is an asset.

To remove this *suggestive* influence of the bracelets, we decided to test sixteen volunteers, including former Olympic gymnast Dominique Dawes, on a brief obstacle course that included a 16'×4"×4" balance beam, a figure-eight–shaped course (which our volunteers ran while holding two thirty-pound dumbbells), and a stretch test. Dawes was there with Yahoo News, which shot some video of our test for a story (http://news.yahoo.com/blogs/weekend-edition/power-balance-wristbands-053237028.html). Dawes, by the way, arrived with a healthy skepticism that seemed to get even stronger when she learned of the test results.

The Power Balance bracelets and their hologram stickers.

In random order, each of the sixteen volunteers went through the course four times: once with the real bracelet on and three times with each of the bracelets that had no holograms. The test was double blind; we taped over the bracelets so that no one—volunteers and testers alike—knew whether each volunteer was wearing a real Power Balance bracelet or one that had had the holograms removed. The power of suggestion was therefore eliminated.

By the end of the test, each of the four bracelets (labeled *A*, *B*, *C*, *D*)—three sans hologram and one "genuine"—had been carried through the course a total of sixteen times. We distributed the bracelets equally among the volunteers through all four rounds of trials to ensure that no bracelet had a numerical or sequential advantage at any given time. (We considered that the experience of running the course in early trials might help the subjects improve their times in their subsequent attempts. To correct for improving scores due to familiarity with the course—sometimes called the "Order Effect"—four people wore bracelet *A* in the first round, four different people wore bracelet *A* in the second round, and so on, for each of the four rounds.)

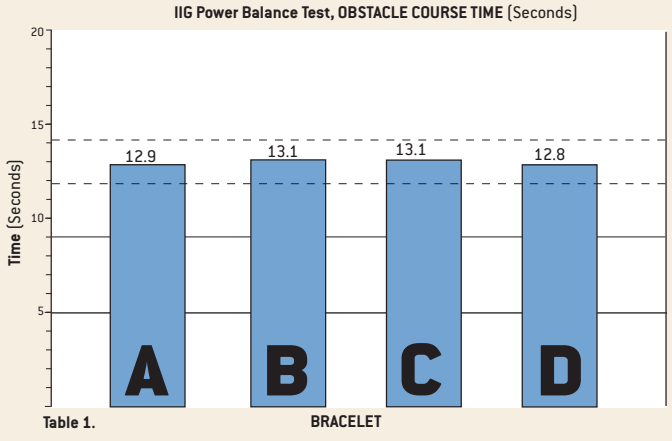


Table 1.

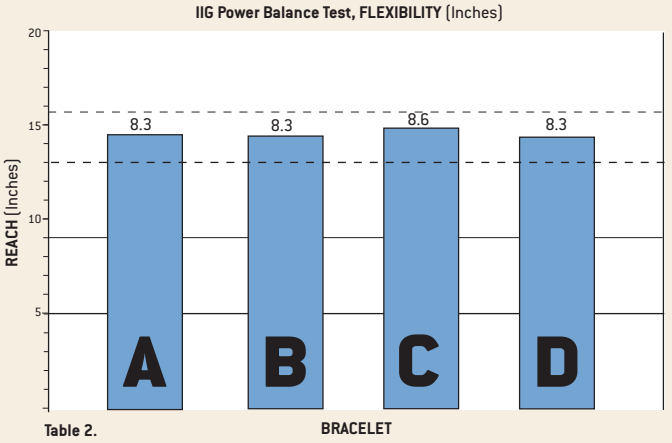


Table 2.

So what happened?

If the one genuine Power Balance bracelet had an intrinsic value that really did confer better balance, flexibility, and strength upon its user, we should have seen cumulatively better scores from the people who wore *that* bracelet (*C*) when compared to the people wearing the three "dummy" bracelets (*A*, *B*, and *D*). The overall scores between the four bracelets were in fact very close together: half the participants who wore the real bracelet did slightly better, and half did slightly worse—exactly as would be expected by chance. Table 1 shows the results of the obstacle course. Bear in mind that a lower time indicates a better performance. When it came to flexibility, the results were much the same: the overall scores were very close. This time, the Power Balance bracelet (also *C* in Table 2) fared slightly better than the other bracelets but, again, not significantly so.

Our initial conclusion was that Power Balance bracelets have no discernable effect when the wearer doesn't know whether or not he or she is wearing one with a hologram. In other words, the bracelet itself doesn't seem to be doing anything. These results are consistent with work done by Richard Saunders for the Australian Skeptics (see "Power Balance Down and Out," SI, News and Comment, September/October 2011) and by John Porcari at the University of Wisconsin at Lacrosse, both of whom conducted blinded tests of Power Balance's efficacy and found no difference between Power Balance products and dummy stand-ins used to blind the user.

The IIG at CFI–Los Angeles has now added its findings to the growing pool of Power Balance's negative test results. Although the bracelet might have some value as a sort of rabbit's foot meant to boost one's confidence, Power Balance bracelets are a bust as a boon to one's athletic prowess. ■

James Underdown is the executive director of the Center for Inquiry–Los Angeles and the chair and founder of the Independent Investigations Group.

He thanks David Richards and Wendy Hughes for their valuable help with this article. He also wishes to thank all those IIG members and volunteers who helped conduct and execute this experiment.

[INVESTIGATIVE FILES JOE NICKELL

Joe Nickell, PhD, is CSI's senior research fellow and author of such books as *Inquest on the Shroud of Turin*, *Relics of the Christ*, and *Looking for a Miracle*.

The Holy Mandylion: A Déjà-view

It was like déjà-vu. In 2008, in a traveling exhibition called "Vatican Splendors," I had seen the Holy Mandylion, also known as the Image of Edessa, which was once held to be the miraculous self-portrait of Christ (Nickell 2009). Now, in Genoa the following year, I was seeing another such image and recalling how in the Dark Ages the Image was said to be able to miraculously duplicate itself—one way to explain how there could be so many "originals."

Pious Legend

The original, according to legend, was produced for King Abgar of Edessa after he sent a messenger, Ananias, with a letter to Jesus requesting a cure for the king's leprosy. If Jesus was unable to come, Ananias was instructed, he was to bring the holy man's portrait instead. But as Ananias attempted to paint a picture Jesus himself intervened, washing his face in water and inexplicably imprinting his visage on a towel—hence the name *Mandylion*, a unique word of Byzantine Greek coinage describing a holy facecloth (Wilson 1979, 272–290; Vatican 2008).

Alas, this legend is unknown before the fourth century; moreover, there are conflicting versions. One attributes the Image to the bloody sweat exuded by Jesus during his agony in the Garden of Gethsemane (Luke 22:44). A later legend holds that a woman named Veronica, who pitied Jesus as he struggled with his cross on the way to his crucifixion, gave him her veil or kerchief with which to wipe his bloody, sweaty face. In fact, however, this made-up tale obviously derives from the fact that *veronica* is simply a corruption of *vera iconica*, medieval Latin for "true image" (Nickell 2007, 71–76). In one revealing fourth-century text of the Edessan legend, the image is not claimed as miraculous but instead merely the work of Hannan (Ananias), who "painted a portrait of Jesus in choice paints" and gave it to the King (qtd. in Wilson 1979, 130).

Astonishingly, many Shroud of Turin devotees, following Ian Wilson (1979, 119–121), believe the "shroud" is the lost original of the Edessan Image! How do they equate the latter's face-only image with the full-length, front-and-back bodily images of the Turin cloth? They imagine the shroud was folded so that only the face showed—never mind its lack of record for over thirteen centuries, a bishop's report of the forger's confession, pigments and paint that make up the image and "blood," and radiocarbon dating to the time of the forger's confession: about the middle of the fourteenth century (Nickell 1998; 2007).

Competing Mandylions

According to the authoritative source *The Dictionary of Art* (Turner 1996), the Edessan Image "entered Christian iconography during the 11th and 12th centuries, first in manuscript picture cycles that were elaborated to accompany narratives of the Edessan legend and then as part of a fixed scheme of images in church decoration." Three of these "original" Mandylions have received the most attention, each supposedly having been the very one brought to Constantinople in 1204 by crusaders. One, the Parisian Mandylion, was acquired by King Louis IX in the thirteenth century and became lost in 1792, probably destroyed in the French Revolution.

Figure 1. The author poses with the Holy Face of Genoa—one of two said to be the Edessan Image, or Mandylion—an allegedly miraculous self-portrait of Christ. (Author's photo)

Of the two surviving examples, the Vatican Mandylion has no certain history prior to the sixteenth century. In 1517 the nuns of San Silvestro in Capito were reportedly forbidden to exhibit it so that it would not compete with their church's "Veronica" (Wilson 1991). The Vatican now concedes (in the official Vatican Splendors exhibit text [Vatican 2008]) that "... the Mandylion is no longer enveloped today by any legend of its origin as an image made without the intervention

	MANDYLIONS	
CRITERIA	**Vatican**	**Genoese**
Radiocarbon date	[None]	1240–1280
Verifiable provenance	From 1517	From 1362
Painting medium	Tempera (unconfirmed)	Egg tempera
Support	Linen affixed to wood panel (cedar)	Linen affixed to wood panel (cedar or poplar)
Process of execution	Has image corrections (e.g., nose once shorter)	Retouched image on cloth covers original *painted on wood*
Inner frame measurements	About $11\frac{1}{2} \times 8$ inches.	About $11\frac{1}{2} \times 8$ inches.
Positions of rivet holes (despite different frames)	[Match Genose frame]	[Match Genose frame]
Date of frame	Uncertain; mounted in 1623 baroque reliquary (by Francesco Comi)	14th-century style

Table 1. Summary comparison of the Vatican and Genoese Mandylions.

of human hands. . . ." I understand this to be an admission that not only is the Vatican version merely an artist's rendering but that such is true of all Mandylions.

This brings us to the other surviving image, the Genoese Mandylion. It, too, lacks meaningful provenance. It is allegedly traceable to the tenth century, but its verifiable history dates only from 1362. At that time Byzantine Emperor John V donated it to Genoa's Doge Leonardo Montaldo after whose death in 1384 it was bequeathed to the Genoese Church of St. Bartholomew of the Armenians. It arrived there in 1388; that is where it remains and where I photographed it (Figure 1), displayed in a gilt-silver enameled frame of the fourteenth-century Palaeologan style.

Interestingly, fragments of ancient Persian and Arabian fabrics were found stuck on the back of the Genoese icon panel. The Arabian fragment is from the sixteenth century, whereas the figural silk Persian one has been attributed to the tenth century on stylistic grounds. However, radiocarbon testing of the wood gave a more reliable date range of 1240–1280 (Wolf 2005).

Similarities

Both the Vatican and the Genoese Mandylions are painted (the Genoese in egg tempera, the Vatican apparently the same) on linen cloth that has been glued to a wood panel (Vatican 2008; Church of St. Bartholomeo degli Armeni 2009; Wilson 1991, 113–114, 137–138). However, both X-rays and tomography (an X-ray technique whereby selected planes are photographed) reveal that the Genoese image-bearing cloth covers *an original image painted on wood* (Bozzo 1994). Also, the Vatican's on-cloth image shows alterations (in X-rays and reflectographic and thermographic photographs), especially in the nose, which was originally shorter, "so that the image originally must have had a different physiognomy" (Vatican 2008, 58).

In 1996, the Vatican Museum's experts concluded (according to Vatican 2008, 58):

> The version in the Vatican and the one in Genoa are almost wholly identical in their representation, form, technique, and measurements. Indeed, they must at some point in their history have crossed paths, for the rivet holes that surround the Genoese image coincide with those that attach the Vatican Mandylion to the cut-out sheet of silver that frames the image. . . . So this silver frame, or one like to it must also have originally covered in the Genoa.

See my summary comparison of the two Mandylions (Table 1—based on Vatican 2008; Bozzo 1974; Wolf 2005).

Indeed, the images themselves, as they now appear to the eye, are remarkably alike. Measurement ratios—involving the most critical areas: the eyes, lengthy nose, and mouth—are strikingly similar. Therefore, when photographs of the images are brought to the same scale (based on inter-pupillary distance), those features effectively superimpose, as I determined by using computer-generated transparencies. (These were prepared by CFI Libraries Director Tim Binga using photos taken by art experts [Wilson 1991, plates 13 and 14]. However, the lack of a forensic scale in each prevents reaching a definite conclusion as to whether tracing might have been involved.)

Conclusions

Since the prototypical image for the later Mandylions and "Veronicas" first appeared in Constantinople in the tenth century, many copies have been made. In one known seventeenth-century instance, no fewer than six "exact" facsimiles were carefully made. Such replicas could later be mistaken for or misrepresented as the original, as happened, for example, with one that was specially made and sent to plague-ridden Venice in the 1470s; it later became known as the Holy Face of Alicante in Spain (Wilson 1991, 101–108).

Perhaps this is what occurred in the case of the two existing Mandylions. The Genoese image, with its older provenance and two-stage creation, appears to be the earliest. Its original image was certainly an artist's copy, since it was painted not on cloth but directly on the wood panel. (One source reports that it has the same dimensions as the missing central panel of a triptych in the St. Catharine's Monastery at Mount Sinai [Wolf 2005].)

Vatican experts acknowledge the evidence suggesting that their Mandylion is "a later replica of the one now in Genoa; that it was produced in the fourteenth century, when the Genoese version . . . was given its existing Palae-

ologan frame; and that it was then placed in the silver frame of the older version," thus explaining the matched rivet holes (Vatican 2008, 57). Their main reservation is that the alterations in the Vatican image's features (especially the nose) may be inconsistent with a simple, direct copy. However, it would seem that the alterations might be due only to the image having been alternately painted and corrected in the freehand process of copying it. Expert examination, in fact, showed "no signs of overpainting" (Vatican 2008, 57).

In brief, then, the totality of evidence is most consistent with the hypothesis that the Genoan Mandylion is a replica, made no earlier than the thirteenth century, and that the Vatican Mandylion is a fourteenth-century copy of that replica. There is no proof that either was directly copied from the now-lost twentieth-century "original," and instead there is proof against it. Neither is there any credible evidence that there was an authentic first-century image of Jesus—miraculous or otherwise. The Shroud of Turin is not such an original, having been proven to be the work of a confessed forger in the middle of the fourteenth century. Thus, the shroud image simply followed the traditional likeness and not the other way around. ■

Acknowledgments

Many people helped with this research project. Massimo Polidoro saw to it that I was invited to Italy's largest science festival (October 30–November 1, 2009); he and others, including Luigi Garlaschelli, Enrico Scalas, Beatrice Mautino, Stefano Bagnasco, Marta Annunziata, and Andrea Ferrero, showed me many kindnesses and accompanied me to various sites for research. I am also most appreciative of Fabio Lottero of Genoa, who returned to St. Bartholomew's to obtain for me an English translation of the official brochure. Closer to home, I am grateful to Tim Binga, Lisa Nolan, Henry Huber, Matt Cravatta, Paul E. Loynes, Chris Fix, and Barry Karr for their help with various aspects of my travel and research—in addition to my longsuffering wife, Diana Harris, who accompanied me in 2008 to view the traveling Vatican exhibit.

References

Bozzo, Collette Dufour. 1974. *Il 'Sacro Volto' di Genova*. Rome: Instituto Nazionale d'Archeologia e Storia dell'Arte; summarized in Wilson 1991, 88, 113–114, 138.

Church of St. Bartholomeo degli Armeni. 2009. *The Holy Face* (Official brochure, in English).

Nickell, Joe. 1998. *Inquest on the Shroud of Turin: Latest Scientific Findings*. Amherst, New York: Prometheus Books.

———. 2007. *Relics of the Christ*. Lexington, Kentucky: University Press of Kentucky.

———. 2009. The Image of Edessa revealed. *Skeptical Briefs* 19(2)(June): 9–10, 15.

Turner, Jane, ed. 1996. *The Dictionary of Art*. 34 vols. New York: Grove's Dictionaries, 20:251, s.v. Mandylion of Edessa.

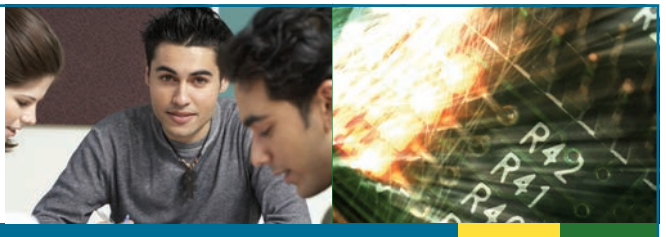
Vatican. 2008. Mandylion of Edessa. In *Vatican Splendors: From Saint Peter's Basilica, the Vatican Museums and the Swiss Guard*. Vatican City State: Governatorato, 55–58.

Wilson, Ian. 1979. *The Shroud of Turin: The Burial Cloth of Jesus Christ?* Revised ed. Garden City, New York: Image Books.

———. 1991. *Holy Faces, Secret Places: An Amazing Quest for the Face of Jesus*. New York: Doubleday.

Wolf, Gerhard. 2005. Das Mandylion von Genua. Available online at www.mpg.de/840449/forschungsSchwerpunkt1.

SCIENCE AND THE PUBLIC



Earn your master's degree in Science and the Public through the University at Buffalo and the Center for Inquiry!

- Explore the methods and outlook of science as they intersect with public culture and public policy. This degree is ideal for enhancing careers in science education, public policy, and science journalism—and prepares you for positions that involve communicating about science.
- This unique two-year graduate degree program is entirely online. Take courses from wherever you are in the world at your own pace! Courses include: Science, Technology, and Human Values; Research Ethics; Critical Thinking; Scientific Writing; Informal Science Education; Science Curricula; and History and Philosophy of Science.

Science and the Public
Graduate School of Education & the Center for Inquiry

For details, visit www.gse.buffalo.edu/online/science
Questions? Contact John Shook, CFI Vice President for Research, at jshook@centerforinquiry.net.

[THINKING ABOUT SCIENCE MASSIMO PIGLIUCCI

Massimo Pigliucci is professor of philosophy at the City University of New York—Lehman College, a fellow of the American Association for the Advancement of Science, and author of *Nonsense on Stilts: How to Tell Science from Bunk*. His essays can be found at www.rationallyspeaking.org.

Hume vs. Rousseau: The Limits of Human Reason

I recently interviewed Robert Zaretsky for the *Rationally Speaking* podcast (www.rationallyspeakingpodcast.org). Zaretsky is the coauthor (with John T. Scott) of *The Philosophers' Quarrel: Rousseau, Hume, and the Limits of Human Understanding*, which touches upon a fundamental concern to the skeptical movement: the role of and constraints on human reason.

Zaretsky and Scott's book is fascinating as a narration of the clash between two of the most influential philosophers of the Enlightenment, set in a time when all of Europe—including politicians and monarchs—was actually paying attention to what philosophers were saying or doing. Rousseau was publicly and harshly criticized by the very father of the Enlightenment, Voltaire, and he was persecuted by the authorities in both France (his adoptive country) and Switzerland (his native land). It is in this context that Hume offered the fugitive philosopher shelter in England, whose monarchy was going to play along just to spite the French.

But Rousseau was paranoid and prone to irrational outbursts, and he soon became convinced (without cause, as it turns out) that Hume was secretly plotting against him. When Rousseau went public with his accusations, Hume was taken aback and felt compelled to respond. All of Europe's intelligentsia joined the fray on behalf of one or the other philosopher, and the two remained on nonspeaking terms until the ends of their lives.

However, my interests lay in the intellectual differences and similarities between Hume and Rousseau about the very nature and import of human reason. Despite both philosophers being considered major players in the Enlightenment, Rousseau was actually a radical critic of the movement (hence Voltaire's vitriol against him), which helped usher in the Romantic reaction to the Age of Reason. Hume was less radical in his rejection of rationality, and yet in some sense his criticisms of it were more powerful and lasting than those of his Swiss counterpart.

To simplify a bit, Rousseau's problem was with rationality as the harbinger of modernity, as well as the philosophes' attitude that reason ought to bridle emotions. In Zaretsky and Scott's book we find the Genevan repeatedly writing to Hume and to his friends in what sounds like a postmodern vein, where "truth" is not something interpersonal and subject to empirical inquiry but something one "feels"; therefore it cannot be questioned by others. He would have driven any modern skeptic positively insane. (I hasten to add that his broader critique of the social contract, as well as his writings about education, are well worth the effort, but they are of course more tangential to the theme of this column.)

Hume, too, was interested in a radical (for the time) reevaluation of emotions and a corresponding cutting down to size of reason. One of his most famous quotes is that "reason is, and ought only to be the slave of the passions," by which he meant that reason tells us how to achieve our goals, but we want to achieve one goal or another because we have "passions." (Before you dismiss this, stop and think about why you are reading this magazine; the answer, at bottom, is that you care about critical thinking—because you have a passion for reason and rationality. It isn't entirely clear that such passion can be defended on logical grounds, and certainly not on those alone.)

Indeed, one of Hume's greatest contributions to philosophy of science was his famous problem of induction, which essentially leads to the conclusion that science itself does not have logical foundations. The argument goes something like this: scientific reasoning is inductive (that is, based on generalizations from empirical evidence, as well as on the assumption of the continuity of nature—meaning that the laws of nature do not change). But how can we justify induction itself? The only defensible answer seems to be "because it has (largely) worked in the past." That answer is itself inductive, so now we find ourselves inside either an infinite regress or an instance of circular reasoning—not good places to be, philosophically speaking.

Nobody has so far discovered an adequate answer to Hume's problem of induction (and many have tried, including most famously Karl Popper), but Hume himself would have advised us not to panic. The realization should simply instill some humility when we talk about the power of reason and science; it is not a motive to abandon either. We use whatever tools we have in the best way we can, even though we have no idea why they seem to work so well—a very pragmatic, as well as humbling, attitude for the philosopher who was so congenial as a human being that his French colleagues called him "le bon David."

So while Rousseau arguably opened the door to the sort of rejection of reason and embracing of emotion that still plagues our post-Romantic and postmodern world, Hume simply reminded us that emotions are just as defining of the human condition as reason is, and appreciating the limits of the latter is, well, the reasonable thing to do for scientists and philosophers alike. ■

[NOTES ON A STRANGE WORLD MASSIMO POLIDORO

Massimo Polidoro is an investigator of the paranormal, lecturer, and co-founder and head of CICAP, the Italian skeptics group. His website is at www.massimopolidoro.com.

The Case of a Weeping Orthodox Icon

Last May, newspapers in Italy and abroad reported that the iconic image of a Madonna had wept tears in the Orthodox Church of Saint Nicholas in Milano. It was the second time that this phenomenon had reportedly happened there.

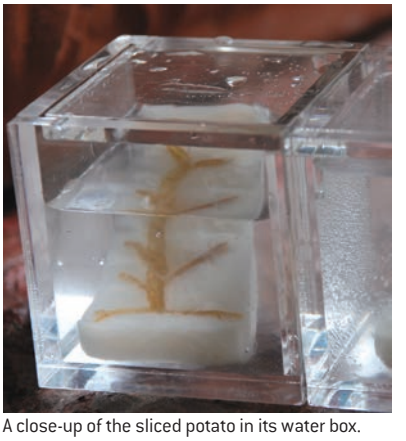
Tears and a Strange Potato

"It was around 4:30 PM and we were cleaning up the church right before the Vespers," said Archbishop Avondios. "Suddenly, somebody noticed that the painting with the Madonna in our church was weeping. The same way as it did last year." In April 2010, the same thing allegedly happened, and it is said that there had been another weeping in 2008.

"A miracle? We don't use that word," said Avondios. "But something has happened. And it is not a trick."

A few days after the event, an Italian television show devoted to the paranormal, *Mistero*, called me asking if CICAP, the Italian skeptics committee, was interested in investigating the case. Of course we were. After obtaining permission from the Archbishop, I went to the little church in Via San Gregorio. The place is quite unique, since the Orthodox Church has been established inside the only remaining building of what was once the Lazzeretto, the place where those suffering from the plague were brought between the fifteenth and seventeenth centuries. The building was once a huge square, but in the following centuries, when the city grew much larger, it was torn down in order to allow for the construction of roads and houses in what is now part of downtown—one of the busiest quarters of Milano.

Father Avondios was there waiting for me, and he was quite willing to help. However, before visiting the church and looking at the painting, we had to wait for the television crew to arrive. So he told me that there was at least one prodigious event that had already taken place since the latest weeping. He introduced me to a woman named Nechita from Eastern Europe who told me that until some weeks before she seemed unable to become pregnant. However, after visiting the icon and praying to the Madonna, the happy event took place and she was now with child.



A close-up of the sliced potato in its water box.

Massimo Polidoro examines the icon that had wept while Father Avondios looks on.

As further proof that something miraculous was going on, she showed me a curious relic. In a plastic box filled with water were two slices of a potato. While cooking at home, Nechita saw a strange dried-up shape that resembled a little tree inside a potato she had cut open. She took it as a sign and decided to keep the slices. Furthermore, although the potato had been cut awhile ago, it had not become dark: it still was clean and white, as if it would keep fresh forever. "We have asked around and nobody has ever seen anything like that," said Nechita. "I am sure that is part of the miracle." I photographed the slices just before the television crew arrived.

Tiny Drops of Something

We finally entered the cramped room that served as the main church hall, where dozens of sacred paintings, icons,

Father Avondios showing the sliced potato with tree shaped signs.

reliquaries, and candles were kept and where women were allowed inside only with their head covered by a shawl. It contained a painting of the Madonna with baby Jesus and two little angels crowning her—a classic orthodox icon, probably not more than fifty years old, with gold and red as the prevailing colors and writing in cyrillic inside it.

The picture had now been put in a case with a glass cover over it in order to preserve it, whereas when the weeping occurred it was left in the open and people could touch it (and they constantly did, as a few films available on the web clearly show). For this occasion, while the cameras were rolling, Father Avondios promptly opened the case and took the painting out for us to see up close. There were traces of some liquid, which had oozed and had now dried up, starting at the eyes of both the Madonna and Jesus and trailing down. "You see?" asked Father Avondios. "There still are little drops of tears. It is still weeping."

It was not actually "weeping," but as I looked closely at the painting I could see that there were in fact tiny little drops of something that still hadn't dried. By running some new cotton swabs on the painting, I was able to capture some of those traces. The idea was to take them to the lab in order to see if some kind of analysis was possible. Father Avondios, a quite young Archbishop with a nice eastern accent and a good sense of humor, was quite helpful. He even took off some splinters from behind the painting with a knife in case we needed to examine those as well.

For the moment that was all I could do. Later I gave the samples to my good friend and colleague Luigi Garlaschelli, a chemist at the University of Pavia, and he checked with their labs to determine what sort of analysis was possible.

A Partial Solution to the Mystery

While that was going on in Pavia, I was interested in checking on the mysterious potato slices. I reached the Agronomy Department at the Regione Piemonte in Turin, where I knew some people who had been crucial in solving a previous "vegetable mystery." I had been shown some apples on whose surfaces odd drawings and dark wavy lines had appeared—bizarre but not uncommon. In fact, it turned out that the apples were suffering from an infection due to poor preservation. I got a similar answer in the case of the strange "tree" in the potato slices. It was a well-known form of plant disease called "empty heart," which is caused by imbalances in nutrients and water. As for the potato remaining preserved, the agronomists explained to me that it is a natural reaction to the fact that the slices were kept under water. Oxygen is what turns a potato or a fruit dark, and the lack of it can only slow down the decaying process.

In a few weeks, Garlaschelli had the results from the Mass Spectrometry Labs in Pavia. It turned out that the substance found on the painting was some kind of vegetable oil. The suspicion that the painting itself had produced the oil was immediately discarded because a) oil paint is made with mineral oil because vegetable oils are easily perishable and b) if it was a natural transudation it would have taken place all over the painting and certainly not only around the eyes of the Madonna and her baby.

What conclusions can be drawn? The most logical one is that the oil came from outside the painting and it was either made to appear by some supernatural (and unproven) means or somebody put it there—it is now impossible to guess who and why. There were many people freely moving around the church area while I was there, and—as shown by various news clips—the painting had been left without a glass cover before our arrival, so anybody who wished could reach and touch it.

Father Avondios wrote to me later: "We have always been and will be very careful in our statements and in declaring true an event or an apparition, independently from the results of the analysis. I have always been open and curious, and that's why I allowed for the tests to be performed. We will still worship and respect the icon of the Madonna not because of a supposed miracle but as an instrument of devotion to the Mother of our Lord."

During our investigation, the police department had concluded work on another weeping Madonna case. This one was a print of a Madonna owned by a couple in Messina, Sicily, that they swore had wept blood. The house had since then been visited by thousands of pilgrims. Finally, the police were able to determine that the blood was human and that the DNA belonged to one of the owners. Now the couple risks charges of "abuse of popular credulity," something that Italian law still considers a crime. ■

"Psychic Vibrations" has appeared in the SKEPTICAL INQUIRER for over thirty years. Sheaffer is also author of *UFO Sightings: The Evidence* (Prometheus Books, 1998). He blogs at www.BadUFO.com.

Comet Elenin "Self-Destructs"—Doomsday Postponed Again!

Sorry to disappoint those who were expecting mayhem and destruction from puny Comet Elenin this fall. The comet began destroying itself before it got close enough to see with the naked eye. This is not exactly surprising, as the same thing has happened to many small comets before. As astronomy writer Kelly Beatty reports,

> Within the past week the comet's brightness has declined by 50%, dropping a half magnitude between August 19th and 20th . . . images show Comet Elenin's bright core becoming elongated and diffuse—the telltale signs that its icy nucleus has either broken in two or disintegrated altogether.
>
> One veteran comet-watcher who's not surprised is John Bortle. Four months ago, based on Elenin's performance to that point, he cautioned, "The comet may be intrinsically a bit too faint to even survive perihelion passage." ("Comet Elenin Self Destructs," *Sky and Telescope*, August 30, 2011; http://tinyurl.com/3stmgmr).

As noted by David Morrison in "Comet Elenin Will Not Destroy Earth This Year" (SI, September/October 2011, p. 5), Comet Elenin was proclaimed by many to be a destructive force headed toward Earth, where it would (somehow) cause something Truly Awful to happen. This was of course absurd, since not only was Comet Elenin quite insignificant as far as comets go, but it was never going to get within twenty million miles of Earth. Those who would not believe the fact-based descriptions of Comet Elenin as a feeble, puny visitor to the inner solar system now must contend with the fact that the comet's icy core simply *melted* as it got closer to the sun.

Amateur astronomer Michael Mattiazzo of Castlemaine, Australia, caught these two images of comet Elenin on August 19 (left) and September 6 (right). The images show a rapid dimming in the comet, possibly hinting at its disintegration.

But I can guarantee that the conspiracy claims will not end there. Soon we'll be hearing how NASA blew up Comet Elenin. Or maybe friendly space aliens did it to save Earth. Or maybe the comet has faded to near-invisibility to better sneak up and surprise unsuspecting Earthlings. But I think the claim that will win out is one that emphasizes the comet's alleged dangerous and destructive nature: "That comet was so radioactive that it blew itself up!" or possibly "Its weapons of mass destruction accidentally triggered prematurely!"

* * *

For more than twenty years, UFO proponents have been citing the 1989–1990 wave of UFO sightings in Belgium as an unexplained mystery. For a period of several months, people in Belgium reported sightings of a triangular-shaped craft. It was one of the major chapters in Leslie Kean's recent best-selling book, *UFOs: Generals, Pilots, and Government Officials Go on the Record.* Even skeptic Michael Shermer's review of Kean's book suggests that the Belgian sightings represent a "residue of anomalies" (*Sci-*

The Belgian news organization RTL reported that the hoaxer (now identified as Patrick Marechal) has given his *mea culpa* and now "lifts the veil" from the mystery.

entific American, March 28, 2011). See my review of her book in the March/April 2011 SKEPTICAL INQUIRER. The review is titled "'Unexplained' Cases—Only If You Ignore All Explanations" because many of the supposedly "unexplained" cases in the book have had explanations published, which she completely ignores.

One big problem with the Belgian wave has always been the lack of photos or movies showing the object, despite hundreds of claimed sightings. Indeed, Kean seeks to dismiss the lack of evidence by noting that "twenty years ago, cell phones and relatively inexpensive, consumer-level digital and video cameras were not yet in use." (True, but film cameras were plentiful and widespread.) Indeed, only one photo claiming to show this supposed "triangular craft" has ever been seen. It was said to have been taken in Petit-Rechain, Belgium, in April 1990 by a twenty-year-old man known only as "Patrick," although it was not released until four months later. The Belgian UFO investigative group SOBEPS investigated the photo and found it to be authentic. So did many other "experts." Belgian Major General Wilfried de Brouwer, a contributor to Kean's book, writes

> A team under the direction of Professor Marc Acheroy discovered that a triangular shape became visible when overexposing the slide. After that, the original color slide was further analyzed by François Louange, specialist in satellite imagery with the French national space research center, CNES; Dr. Richard Haines, former senior scientist with NASA; and finally Professor Andre Marion, doctor in nuclear physics and professor at the University of Paris-Sud and also with CNES.

The creator of the Petit-Rechain photo (above) has now confessed to the hoax

UFO skeptics have long supplied reasons why this photo is not credible. For one thing, it shows nothing in the background to allow its size or distance from the camera to be determined. It could as easily be a tiny model seen close-up as a giant hovering craft. In the 1990s the Belgian skeptic Wim van Utrecht showed that the photo could easily be reproduced using a small model. In a recent issue of Tim Printy's webzine *Sunlite*, an article by Roger Pacquay notes several inconsistencies about the photo (see http://home.comcast.net/~tprinty/UFO/SUNlite3_2.pdf)

Now we have a confession. The Belgian news organization RTL reported that the hoaxer (now identified as Patrick Marechal) has given his *mea culpa* and now "lifts the veil" from the mystery. The reporter interviewed Marechal in his home, where he showed them many slides and prints. According to the RTL report, "The UFO of Petit-Rechain is not a spaceship from a distant galaxy but a panel of painted styrofoam with three spots affixed" (http://tinyurl.com/3ehg6v6). Marechal explained that once he showed his hoaxed photo to his coworkers, the situation quickly got out of control, and he could no longer hold back the photo's march all across the world; he had "managed to fool the whole world with a silly model made of styrofoam."

This confession is very bad news for Leslie Kean. On August 25 the History Channel premiered a UFO documentary titled *Special Access: UFOs on the Record* based upon her book. Among the "strongest evidence" presented in the show was the Belgian UFO wave. Much is made of the Petit-Rechain photo, both in the book and on the

show. On the latter, Kean calls the Petit-Rechain photo "one of the most convincing" pieces of evidence for the existence of UFOs." Worse yet for Kean, the Belgian UFOlogist Patrick Ferryn, who is featured prominently on the program proclaiming the validity of the Petit-Rechain photo, now acknowledges that it is a hoax. Ferryn was quoted by Belgian TV on July 26 stating that the bogus UFO photo from Petit-Rechain does not in any way invalidate the Belgian UFO wave that began in November of 1989 (http://tinyurl.com/3rzknbv). (True enough, but it does remove the sole supposed photographic evidence for thousands of reported sightings.) Kean did not volunteer any comments on Marechal's confession, but when she was interviewed by SI Deputy Editor Benjamin Radford for *Discovery News* (see http://tinyurl.com/RadfKean), she acknowledged the difficulty the confession poses. However, she says she is not yet sure whether or not the hoaxer's confession is to be believed (see http://tinyurl.com/KeanBe).

Former Arizona governor Fife Symington is one of Kean's favorite witnesses concerning the famous "Phoenix Lights" (although exactly how he became a "former governor" is never spelled out). He now claims to have "held back" UFO information and claims to have seen Arizona's most famous UFO fly over, which he never mentioned before. How credible is Fife Symington? As the *New York Times* reported in a September 4, 1997 headline, "Arizona Governor Convicted of Fraud and Will Step Down" (http://tinyurl.com/krz46o). Symington was convicted on seven felony counts—a fact Kean conceals from her audience. The conviction was later overturned because of possible misconduct concerning a juror, and he was pardoned by President Clinton before he could be retried. If I were looking for someone whose testimony was credible, Fife Symington would be among the worst possible choices.

Little has been written about the "Incursion at O'Hare Airport" on November 7, 2006, which is a major case for Kean. Several employees of United Airlines reported seeing a "strange object hovering just under a cloud bank. . . . The metallic-looking disc was about the size of a quarter or half dollar held at arm's length." Unfortunately, no photographs exist of this supposed "metallic-looking disc" hovering over one of the world's busiest airports in daytime, and nothing showed up on radar. Even more surprising, we learn in Kean's documentary that the UFO hovered over gate C-17 at O'Hare. Apparently it was not seen by anyone at gate C-15, gate C-16, or anywhere else.

After anywhere from five to fifteen minutes, "the suspended disc suddenly shot up at an incredible speed and was gone in less than a second, leaving a crisp, cookie-cutter-like hole in the dense clouds. The opening was approximately the same size as the object [I would suggest that the opening *was* in fact the object], and those directly underneath it could see blue sky visible on the other side." Kean ridicules an explanation offered by an FAA spokesman that the observers saw a "hole-punch cloud," an unusual weather phenomenon where a large, dramatic circular hole is formed in a cloud layer. She cites a report by NARCAP, a pro-UFO investigative team, showing that temperatures were too high for a hole-punch cloud to form at the 1,900-foot elevation of the ceiling, which is probably correct. (Kean has no difficulty referencing investigations by other researchers, so long as their conclusion agrees with hers.) But then she bizarrely suggests that "this just happens to fit the witnesses' explanation of what they saw: a high-energy, round object very likely to be emitting some form of intense radiation or heat while cutting through the cloud bank." Now, one cannot simultaneously argue that a hole-punch cloud could not have formed because the temperatures were above freezing and that a UFO formed one anyway. In any case, the low ceiling might easily have briefly opened up to reveal a much higher cloud layer where a hole-punch cloud already existed. It is interesting that the photo used on a National Oceanic and Atmospheric Administration website to illustrate the phenomenon of the hole-punch cloud was taken in nearby Wisconsin exactly eight days after the O'Hare Field "incursion," (www.crh.noaa.gov/grb/?n=holepunch). ■

Kean did not volunteer any comments on Marechal's confession, but when she was interviewed by SI Deputy Editor Benjamin Radford for *Discovery News*, she acknowledged the difficulty the confession poses.

Steven Novella, MD, is assistant professor of neurology at Yale School of Medicine, the host of the *Skeptics' Guide to the Universe* podcast, author of the *NeuroLogica* blog, executive editor of the *Science-Based Medicine* blog, and president of the New England Skeptical Society.

In Multiple Sclerosis Treatments, Hope Trumps Reason

New ideas are presented in science and medicine all the time. This is healthy and necessary—we have to keep churning the pot so that new ideas can emerge and our thinking does not become calcified. But science is both a creative and destructive process, and most new ideas are weeded out by the relentless filtering process of research and peer review.

However, to patients suffering from an incurable disease a new idea represents one thing: hope. Science, by contrast, cares only about what works and is dispassionate, which is easily portrayed as heartlessness. Hopeful nonsense thus has a public relations advantage over pitiless science every time.

We are seeing this effect now with a new idea in the science of multiple sclerosis (MS). A lone Italian vascular surgeon, Paolo Zamboni, proposed that MS is not caused by an autoimmune process (the immune system attacking the nervous system) but rather by blockages in the veins that drain blood from the brain. He published his initial study that found a "dramatic" association between MS and these venous blockages (Zamboni et al. 2009). He called the condition chronic cerebrospinal venous insufficiency (CCSVI).

The paper set off a bitter controversy. Zamboni is suggesting that decades of MS research have been on the wrong track and that he has found the true cause—and potential cure—of MS with a simple diagnostic procedure. The press loved it—a lone maverick challenging the status quo with a bold new idea. Many patients with progressive and difficult-to-treat MS also loved it, for it provided hope of an effective treatment. (As an aside, there are several effective treatments for MS but not all types of MS or all patients respond.) When the neurological community treated Zamboni's claims with (perfectly reasonable) skepticism, some patients began to weave conspiracy theories to explain the resistance. They wanted the new treatment, and they didn't want stuffy neurologists getting in the way because their turf was being threatened by a surgeon (at least that is the narrative they told each other.) But science is pitiless and doesn't care for narrative, turf, or good headlines.

To patients suffering from an incurable disease a new idea represents one thing: hope. Science, by contrast, cares only about what works and is dispassionate, which is easily portrayed as heartlessness. Hopeful nonsense thus has a public relations advantage over pitiless science every time.

Despite the low plausibility and the fact that Zamboni's claims ran counter to the carefully accumulated MS research to date, many centers set about to replicate his findings. Replication is a key process in science. If a phenomenon is real, then it will be real in any lab. Zamboni's findings were dramatic, so they should be easy to replicate.

Two years later we have several good replications. One study did produce similar findings to Zamboni, although the association was not as strong (Al-Omari and Rousan 2010). The next three, however, were all dead negative (Sundström et al. 2010; Doepp et al. 2010; Krogias et al. 2010). Skepticism mounted. Another study this year comparing MS patients to normal controls concluded, "This triple-blinded extra- and transcranial duplex sonographic assessment of cervical and cerebral veins does not provide supportive evidence for the presence of CCSVI in MS patients. The findings cast serious doubt on the concept of CCSVI in MS" (Mayer et al. 2011).

The largest replication to date (Zivadinov et al. 2011) found a small association between venous blockage and MS and concluded, "Our findings are consistent with an increased prevalence of CCSVI in MS but with modest sensitivity/specificity. Our findings point against CCSVI having a primary causative role in the development of MS."

These findings are interesting. They do not entirely rule out a correlation between CCSVI and MS. However, the results are very ambiguous. There is a statistical correlation between MS and CCSVI, but there is also a correlation with other neurological diseases—with very different histories and probable causes from those of MS. CCSVI was also found in a quarter of healthy controls. So CCSVI is not specific to MS, and almost half of MS patients do not meet criteria for CCSVI.

To summarize all of the existing research on CCSVI and MS: The results are mixed with variable methodology used but are generally negative. No one has found the dramatic results first published by Zamboni. After a couple years of research, his implausible idea is not looking very good. At best we can say that there may be a small and inconsistent correlation between venous blockages and MS. If the correlation is true, it is also possible that these blockages are a result of MS, perhaps caused by inflammation, and are not necessarily a cause of MS.

Despite these largely negative findings, there are still many MS patients clamoring for treatment. The treatment of CCSVI is called the liberation procedure (essentially opening up the blocked veins, a procedure not without risk). Clinics are opening up offering the treatment to desperate patients—putting treatment ahead of the evidence or even using a treatment in the face of negative evidence, which is always a bad idea.

There are also calls, especially in Canada, for clinical trials of the liberation procedure. Such trials are not justified by the science that has been done so far, but because clinics are already offering the liberation procedure, this may force the hands of MS researchers. Before subjecting people to experimental medical interventions, ethics demands that we do sufficient basic science research to demonstrate that there is at least a reasonable chance of benefit. We have not crossed that line with CCSVI and the liberation procedure. Advocates of the procedure, however, are likely to succeed in making an end run around the usual safeguards of ethical medical research.

Those promoting CCSVI and the liberation procedure are likely to be portrayed by some in the media and by hopeful patients as brave mavericks. That is the hopeful, romantic, and sensational view. I suspect, however, that in the end the science will tell a different story. ■

References

Al-Omari, M.H., and L.A. Rousan. 2010. Internal jugular vein morphology and hemodynamics in patients with multiple sclerosis. *International Journal of Angiology* 29(2): 115–20.

Doepp, F., F. Paul, J.M. Valdueza, et al. 2010. No cerebrocervical venous congestion in patients with multiple sclerosis. *Annals of Neurology* 68 (2): 173–83.

Krogias, C., A. Schröder, H. Wiendl, et al. 2010. Chronic cerebrospinal venous insufficiency and multiple sclerosis. Critical analysis and first observation in an unselected cohort of MS patients. *Der Nervenarzt* 81(6): 740–46, DOI: 10.1007/s00115-010-2972-1.

Mayer, C.A., W. Pfeilschifter, M.W. Lorenz, et al. 2011. The perfect crime? CCSVI not leaving a trace in MS. *Journal of Neurology, Neurosurgery and Psychiatry* 82(4): 436–40.

Sundström, P., A. Wåhlin, K. Ambarki, et al. 2010. Venous and cerebrospinal fluid flow in multiple sclerosis—a case-control study. *Annals of Neurology* 68(2): 255–9.

Zamboni, P., R. Galeotti, E. Menegatti, et al. 2009. Chronic cerebrospinal venous insufficiency in patients with multiple sclerosis. *Journal of Neurology, Neurosurgery and Psychiatry* 80(4): 392–9.

Zivadinov, R., K. Marr, G. Cutter, et al. 2011. Prevalence, sensitivity, and specificity of chronic cerebrospinal venous insufficiency in MS. *Neurology* 77(July): 138–44.

POINT OF INQUIRY

Where can you hear the leading voices of skepticism and science on a weekly basis? On *Point of Inquiry*, the Center for Inquiry's podcast and radio show, which is now one of the most popular science programs online.

Listen for free at **www.pointofinquiry.org** today!

Each week, *Point of Inquiry* brings you incisive interviews, features, and commentary, focusing on the three research areas of the Center for Inquiry: pseudoscience and the paranormal; alternative medicine; and religion, ethics, and society.

In addition to new shows every Friday, the entire archive of past episodes can be accessed online at www.pointofinquiry.org.

Previous popular guests include:

RICHARD DAWKINS

SAM HARRIS

NEIL DEGRASSE TYSON

ANN DRUYAN

and many more!

Hosted by
CHRIS MOONEY
ROBERT M. PRICE
KAREN STOLLZNOW

www.PointofInquiry.org

[SCIENCE WATCH KENNETH W. KRAUSE

Kenneth W. Krause is a contributing editor and books editor/columnist for the *Humanist* and a contributing editor for the SKEPTICAL INQUIRER. He may be reached at krausekc@msn.com.

In Vitro Meat: An Imminent Revolution in Food Production?

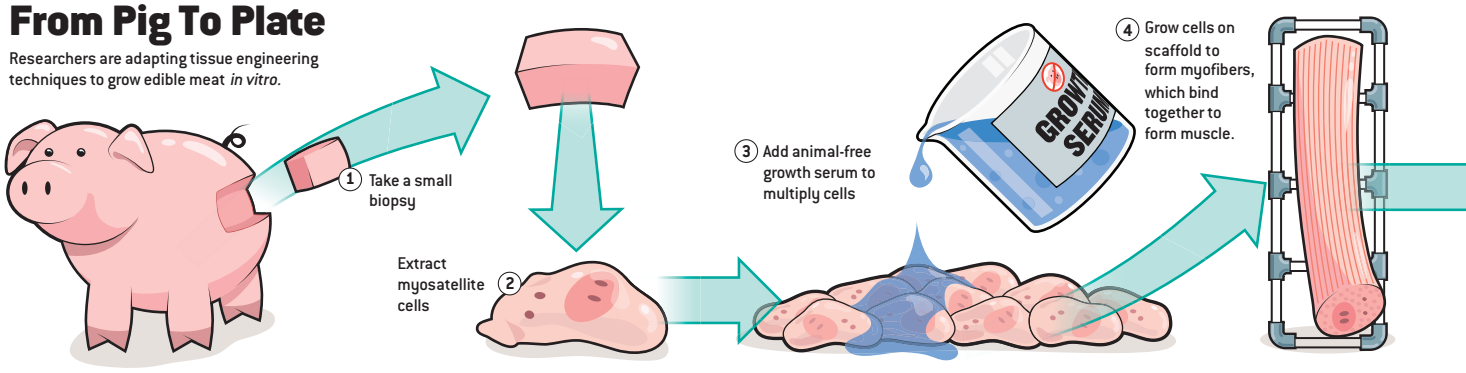
Some ideas make so much sense that you know great minds somewhere must be working on them. The impediments could be political, cultural, technological, or more often some formidable combination of all three. But in extremely rare instances one can't help but believe that a particularly powerful idea's time has finally arrived. Biologists, conservationists, and economists around the world are saying precisely that about the commercial production of cultured, or *in vitro*, meat.

The facts surrounding "slow-grown" meat are compelling, to say the least. Conventional meat production is a $1.4 trillion industry globally. We consumed 228 million tons of flesh in 2000, and that number is expected to more than double by 2050 as world population swells to nine billion. Gorging themselves on 40 percent of the planet's cereal grain, livestock also use and despoil about 30 percent of the earth's surface, 70 percent of its arable land, and 8 percent of its water supply.

The world's 1.5 billion livestock are responsible for between 15 and 24 percent of all anthropogenic greenhouse gasses—including 68 percent of ammonia, 65 percent of nitrous oxide, 37 percent of methane, and 9 percent of carbon dioxide. Beef ranching accounts for 80 percent of Amazon deforestation, and cattle, which defecate 130 times more by volume than humans, dump 64 million tons of sewage in the United States alone. Pigs, of course, are no less prolific.

When we use antibiotics on intensively farmed animals, we contribute mightily to the emergence of multidrug–resistant strains of bacteria. Animal diseases—the chicken flu, for example—can lead to novel epidemics or even pandemics capable of killing millions of people. What are the most common causes of food-born diseases in the United States, the European Union, and Canada? That's right: contaminated meats and animal products. And don't forget that the nutritional maladies associated with animal fats—diabetes and cardiovascular disease, in particular—are now responsible for a full third of global mortality.

In rather stark contrast, meat grown in culture doesn't poop, burp, fart, eat, overgraze, drink, bleed, or scream in agony—and it's a great deal less likely to poison, infect, or kill us. In those bright practical and ethical lights, a growing number of scientists are hopping onto the cultured meat bandwagon. The conventional meat industry "no longer makes sense," according to Zuhaib and Hina Bhat, Indian biotechnologists and authors of an enlightening new study on cultured meat (Bhat 2011). All things considered, they argue, the transition to "an *in vitro* meat production system is becoming increasingly justifiable." And although the technology is still in its early stages, adds a seasoned trio of Dutch veterinary scientists, cultured


From Pig To Plate
Researchers are adapting tissue engineering techniques to grow edible meat *in vitro*.
1 Take a small biopsy
2 Extract myosatellite cells
3 Add animal-free growth serum to multiply cells
4 Grow cells on scaffold to form myofibers, which bind together to form muscle.

Cultured meat is not a new idea. Back in the 1920s, in fact, Winston Churchill predicted its use within fifty years. Following the discovery of stem cells and the development of the *in vitro* tissue culture, Dutch scientist Willem van Eelen first patented the idea in 1999.

meat "holds great promise as a solution" to reduce livestock's horrific impact on the environment (Haagsman 2009).

To that noble end, Hanna Tuomisto and M. Joost Teixeira de Mattos from the Universities of Oxford and Amsterdam, respectively, calculated the likely energy use, greenhouse gas emissions, and land requirements associated with large-scale *in vitro* meat production (Tuomisto 2010). When contrasted with the conventional industry in Europe, cultured meat would involve 35–60 percent less energy use for pork, sheep, and beef, they say, and 80–95 percent lower greenhouse gas emissions and 98 percent reduced land use overall. Although *in vitro* chicken could require 14 percent more energy, if land use savings were partially converted to bioenergy production, the total energy efficiency of the cultured product would still prevail.

And because most greenhouse gas emissions caused by cultured meat production are associated with fuel and electricity use, such emissions could be further reduced through the application of renewable energy sources. That potential doesn't exist for the conventional industry because most of its emissions are produced by methane from manure and enteric fermentation and nitrous oxide from the soil.

Cultured meat would also promote wildlife conservation, Tuomisto and de Mattos contend, because it shrinks economic pressure to convert natural habitats to agricultural lands, and it provides an alternative means of producing meat from rare, endangered, or currently overhunted or over-fished species. And although neither transportation nor refrigeration expenses were figured into their studies they add that such costs would likely be less with *in vitro* meat. Whole animals wouldn't need to be hauled about, after all; production sites could be located closer to actual consumers; and the finished product would present fewer issues relating to microbial contamination.

Not that cultured meat is a new idea. Back in the 1920s, in fact, Winston Churchill predicted its use within fifty years. Following the discovery of stem cells and the development of the *in vitro* tissue culture, Dutch scientist Willem van Eelen first patented the idea in 1999. In 2002, NASA financed a study involving the culturing of a goldfish fillet to explore the possibility of growing meat for long-term space flight (Benjaminson 2002).

Since then, most of the research has taken place in the Netherlands. Between 2005 and 2009, the Dutch government funded a study exploring the possibility of culturing skeletal muscle cells from farm animal stem cells. The group was largely successful, but unfortunately the US$2.6 million grant has since expired without renewal.

The general process behind *in vitro* meat is relatively basic. In theory, embry-

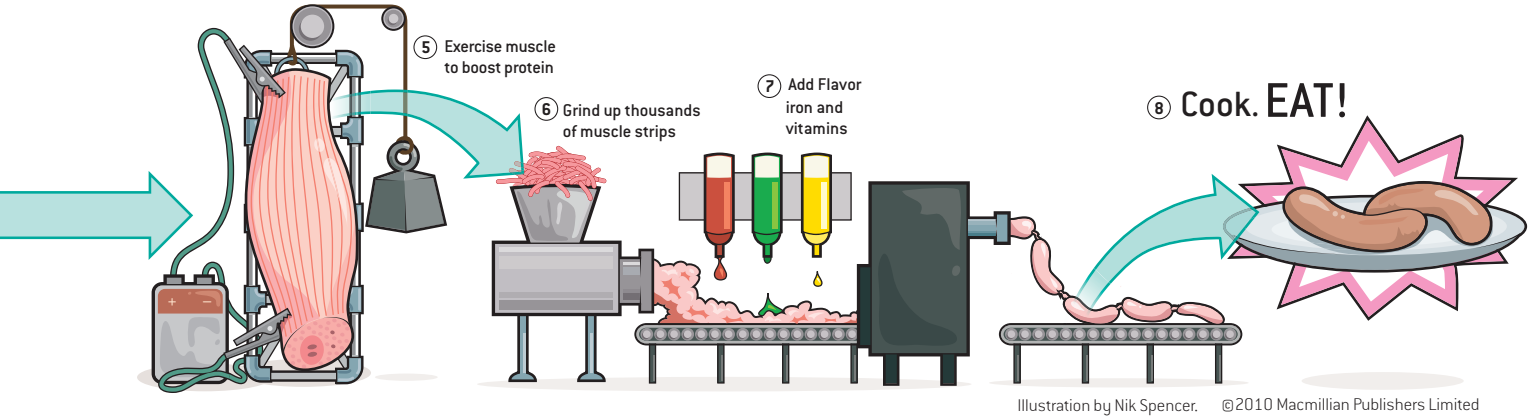


Illustration by Nik Spencer. ©2010 Macmillian Publishers Limited

A New Way of Growing Meat

Scientists are in the process of developing an alternative way to grow meat, not from an animal but from a petri dish. This laboratory-grown method, still in the early stages of development, already has the support of many people concerned about cruelty to animals, energy shortages, and climate change.

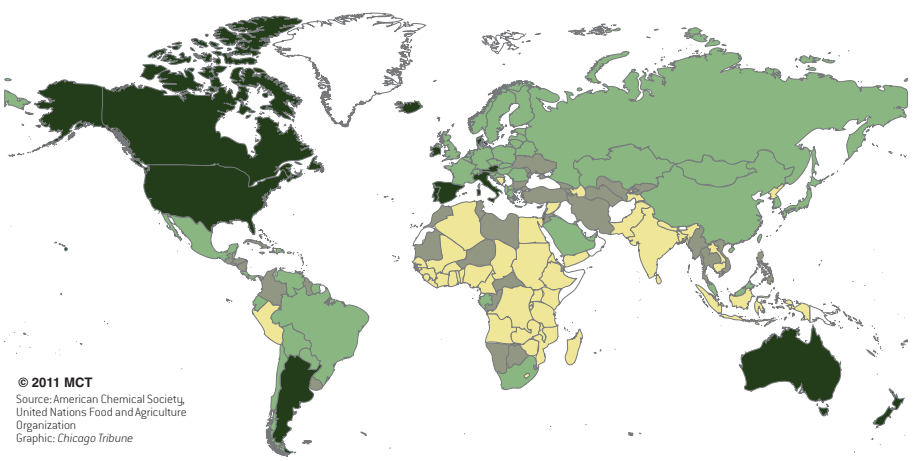
Resources used to grow cultured meat vs. other meat products

Relative percentage compared with beef

	Beef	Sheep	Pork	Poultry	Cultured meat
Energy use	100%	70.6%	59.2%	40.5%	55.2%
Greenhouse gas emissions	100	79.6	22.0	23.2	4.9
Land use	100	61.3	37.0	34.1	.59
Water use	100	37.6	37.0	22.1	3.5

Meat consumption by country

Pounds consumed per person in 2007



© 2011 MCT

Source: American Chemical Society, United Nations Food and Agriculture Organization

Graphic: *Chicago Tribune*

onic stem cells could provide a cheap and unending supply of cultured meat. But scientists have yet to isolate and develop such cell lines from farm animals. Thus most of the research so far has involved myosatellites, or the adult stem cells that grow and repair muscle.

Myosatellites are extracted from a small biopsy—reasonably painless to the animal—using enzymes or pipetting. A bacterial-based growth serum is applied to multiply the stems. Researchers then coax them to differentiate into muscle cells, which are grown on an edible or biodegradable scaffold to form myofibers. Those, in turn, are exercised under tension—as if in a miniature, high-tech gymnasium—to build bigger muscle tissues. The appropriate level of stress can be achieved in a variety of ways, including electrical impulses, anchor points, or possibly microspheres.

Once produced on a commercial scale using bioreactors, producers could then grind the muscle strips while adding spices, iron, and vitamins to taste. In a nutshell, that's the proposed method for creating processed meats like sausages and hamburger patties. The fabrication of structured meats like steaks will be more complicated because as muscle fibers grow larger—more than 200 micrometers thick—they tend to die off as their inner cell layers become isolated from the flow of nutrients and oxygen.

Regardless of the specific goal, scientists face difficult challenges at every phase of production. As African food security expert Phillip Thornton explains, although *in vitro* meat currently represents a "perfectly feasible" "wildcard" driver of change in the livestock industry—indeed, in world culture more sweepingly—"at least another decade of research is needed" before we can even begin to effectively confront the critical issues of scale and cost (Thornton 2010).

Stem cells, of course, are a bountiful source of both amazement and frustration for everyone who works with them. Scientists would love to culture the embryonic lines from farm animals because of their incomparable regenerative capacity—ten cells, according to the Dutch

Stem cells, of course, are a bountiful source of both amazement and frustration for everyone who works with them. Scientists would love to culture the embryonic lines from farm animals because of their incomparable regenerative capacity ...

Compared to its conventional counterpart, cultured meat will allow us to lead significantly safer and more sustainable lives. We will be able to control not only its flavor but its nutritional composition as well.

group, could produce 50 million kilograms of meat within two months. But even if we develop that technology, embryonic stems must be specifically stimulated to produce myoblasts and at present we have no way of guaranteeing they will do so accurately.

Myosatellites, by contrast, have been successfully isolated from the muscle of cattle, chicken, turkeys, pigs, and fish. But in addition to their general rarity and severely limited regenerative abilities, myosatellites have different capacities to proliferate, differentiate, and respond to growth factors depending on their specific muscle of origin. Adipose-derived adult stems provide an attractive potential alternative, the Indian team notes, because they can be obtained less invasively from subcutaneous fat and can differentiate into multiple cell lineages, including muscle.

As anchorage-dependent cells, myoblasts require some sort of substratum or scaffold upon which to proliferate and differentiate. The challenge here is to develop structures that mimic the *in vivo* milieu. They should have large surface areas for growth and be flexible enough to facilitate contraction. And their by-products must be edible, natural, and derived from non-animal sources. Researchers have proposed a number of inventive solutions, including porous collagen beads or meshworks, large sheets or thin filaments, and microspheres made of cellulose, alginate, chitosan, or collagen that fluctuate in size following slight changes in temperature or pH.

To commercialize the process, we'll need new bioreactors as well—ones that maintain low sheer and uniform perfusion of nutrients at large volumes. Balancing centrifugal, drag, and gravitational forces, rotating bioreactors allow the structures inside to stay medium-submerged in a perpetual state of free fall. In theory, research-size rotating systems can be scaled up to industrial capacity without affecting their physics.

Perhaps most crucial of all, however, is progress toward a cheap, clean, and consistently effective culture medium. At this point, myoblast culturing usually occurs in animal (fetal calf or horse) serums, which are expensive, highly variable in composition, and potentially rife with infectious contamination. They also raise familiar ethical concerns for some and rather defeat the important point of creating an animal-free protein product.

Serum-free, chemically defined media have already been developed to support turkey, sheep, and pig myosatellites, and one particularly inventive researcher has employed a medium made from maitake mushroom extract. Thus far, however, the price of these media is not practical for mass production. In addition, we need to formulate species- and cell-specific arrays of growth factors to effectively control proliferation and differentiation.

Clearly we have much left to achieve. Then again, as a group of Dutch and American researchers observed six years ago in the very first peer-reviewed paper published on the subject, the technical challenges facing cultured meat producers are far less daunting than those facing scientists pursuing the application of engineered muscle tissue in a clinical setting (Edelman 2005). And maybe the Dutch group put it best two years ago: "It may seem somewhat premature to start a societal discussion," they advised. "However, food is a subject that evokes many emotions: it is, if we recall the turmoil associated with the introduction of genetically modified foods, a good idea to educate citizens about all aspects" of *in vitro* meat and to do so now.

Compared to its conventional counterpart, cultured meat will allow us to lead significantly safer and more sustainable lives. We will be able to control not only its flavor but its nutritional composition as well. It will free our valuable resources and our land, minimize animal suffering, and satisfy mounting consumer demand for protein across the globe. How can we transform this truly great idea into a reality? At this critical point, experts contend, we require only the degree of public investment long lavished upon *in vitro* meat's dirty, dangerous, inefficient, and plainly outdated predecessor. ■

References

Benjaminson, M.A., J.A. Gilchriest, and M. Lorenz. 2002. *In vitro* edible muscle protein production system (MPPS): Stage 1, fish. *Acta Astronautica* 51: 879–89.

Bhat, Z.F., and H. Bhat. 2011. Animal-free meat biofabrication. *American Journal of Food Technology* 6(6): 441–59.

Edelman, P.D., D.C. McFarland, and V.A. Mironov, et al. 2005. Commentary: *In vitro*-cultured meat production. *Tissue Engineering* 11(5/6): 659–62.

Haagsman, H.P., K.J. Hellingwerf, and B.A.J. Roelen. 2009. Production of animal proteins by cell systems: Desk study on cultured meat ("kweekvlees"). University of Utrecht, Faculty of Veterinary Medicine.

Thornton, P.K. 2010. Livestock production: Recent trends, future prospects. *Philosophical Transactions of the Royal Society B* 365: 2853–67.

Tuomisto, H.L., and M.J.T. de Mattos. 2010. Life cycle assessment of cultured meat production. 7th International Conference on Life Cycle Assessment in the Agri-Food Sector, September 22–24, 2010, Bari, Italy.

[SKEPTICAL INQUIREE BENJAMIN RADFORD
Benjamin Radford is a research fellow at the Committee for Skeptical Inquiry and author or coauthor of six books, including *Tracking the Chupacabra: The Vampire Beast in Fact, Fiction, and Folklore.*

The Bell Witch Mystery

Q: What's the truth behind the "Bell Witch" story?

—J. Rodgers

A: The Bell Witch case is one of the oldest American ghost stories. It is also widely said to be one of the most credible and best-documented poltergeist cases in history. Not only were the ghostly goings-on seen by dozens of credible eyewitnesses (including a future president of the United States), but the case was even "validated by the State of Tennessee as the only case in U.S. history where a spirit has caused the death of a human being" (Schager 2006).

According to James McCormick and Macy Wyatt in their book *Ghosts of the Bluegrass*, "The famous Bell Witch ghost story seems to have originated in the town of Adams, Tennessee, in the early 1800s. A prosperous farmer, John Bell, and his family came under the attack of a poltergeist known as the Bell Witch. The cruel things the family experienced were known far and wide, and were even said to have been investigated by Andrew Jackson, who lived nearby" (McCormick and Wyatt 2009, 94).

The whole story is lengthy and complex (and, in classic folklore tradition, has many variants), but it basically involves a Tennessee farmer named John Bell Sr., who in 1817 found a mysterious creature with the body of a dog and the head of a rabbit. The Bell family later heard menacing scratching and growling noises coming from outside their cabin at night. The ghostly assaults began when the youngest Bell daughter, Betsy, was attacked by an invisible entity. The frequency and violence of the attacks increased, and soon objects were flying through the air, hurled by unseen forces. Eventually the spirit, an old woman named Kate Batts, held conversations with the Bell family, revealing that she was taking revenge on John Bell for having cheated her in a trade of goods. (In one variation of the story that circulated in Mississippi, the witch was not a woman named Kate but instead the spirit of a male slave whom John Bell had killed for having been Betsy's illicit lover [Hudson and McCarter 1934]). The witch ends up killing John Bell and then finally leaves the family in peace.

Betsy Bell, said to have been haunted by the Bell Witch ghost in the 1800s.

As with many ghost stories, the Bell Witch story has been retold countless times. The legend has appeared in several books, including *The Bell Witch: An American Haunting* (Monahan 2000), and has been adapted into several horror films, including *An American Haunting*.

The story, full of drama and details, is terrifying if it's true—but it isn't. Despite many books, magazine articles, and websites offering claims to the contrary, there's no evidence that any of the events took place (though the Bell family was real). As *Slate* writer Grady Hendrix notes, "Most of the books about the Bell Witch are sourced from an 1894 volume called *An Authenticated History of the Famous Bell Witch* [subtitled *The Wonder of the 19th Century, and Unexplained Phenomenon of the Christian Era*] by Martin Van Buren Ingram. This volume was written 60 years after the fact and is regarded by some historians as a novel that used real people and places to give it the appearance of reality." Ingram's book, which claims to "record events of historical fact, sus-

tained by a powerful array of incontrovertible evidence," is almost certainly a work of fiction mistaken for fact because the author claimed it was true.

In fact I investigated another famous (and very similar) haunting in which exactly the same thing reportedly happened: the Rose Hall mansion in Montego Bay, Jamaica, is said to be haunted by a witch named Annie Palmer. The legend of the White Witch of Rose Hall (which also includes stories of slavery, cruelty, passions, and ghostly revenge) is believed by many to be a true story, but it is in fact based on a 1929 novel that—like the Bell Witch story—used real people and locations for verisimilitude (see Radford 2010).

The Bell Witch story was identified as legend as far back as the 1930s, and it was even discussed in scholarly folklore publications such as *The Journal of American Folklore* (see, for example, Hudson and McCarter 1934). So why is this obviously fictional story widely regarded as true, or at least based on real events? Largely because the public has often been explicitly told that the story is true by the "original" source, by uninformed writers, and by people who know (or should know) that it's a legend but market their version as a true story anyway.

Veteran ghost researcher Brad Steiger, who is typically careful to keep his books uncontaminated by skepticism or verified facts, devotes eight pages of his 2003 book *Real Ghosts, Restless Spirits, and Haunted Places* to retelling one version of the Bell Witch legend, apparently never realizing that it's a completely fictional tale. William Birnes and Joel Martin, in their book *The Haunting of America: From the Salem Witch Trials to Harry Houdini*, make the same mistake and even lamely suggest that "skeptics blame Betsy, accusing her of fabricating the Bell Witch phenomena. However, no one ever proved that…" (145).

First of all, the burden of proof is not on skeptics to *disprove* anything but rather for the proponents to prove Betsy's claims. More to the point, skeptics recognize that the *entire story* is a legend—including Andrew Jackson's involvement (there is no reference to the Bell Witch in any of Jackson's writings and no evidence that he'd heard of the story [Hendrix 2006]). The problem is not that Betsy Bell may have lied about being attacked by a ghost; it's that the original source for the Bell Witch story made the whole thing up. It's like arguing about whether Huckleberry Finn lied when he said his drunken father beat him; it's all in the context of fiction. The fact that Steiger, Birnes, and countless other "experts" have mistaken legend for fact (or not bothered to separate the two) does not speak well for their scholarship or credibility.

Passing fiction off as fact is of course nothing new. Horror books and films have a long tradition of claiming mysterious, ghostly, and supernatural events as having basis in fact when they were either largely or completely fictional. Classic examples include William Peter Blatty's novel *The Exorcist* (and the film version); Jay Anson's novel *The Amityville Horror: A True Story* (and the film version); and Ray Garton's book *The Haunting in Connecticut* (and the film version), among many others (see Radford 2009 and MonsterTalk 2011).

The Bell Witch story is important for would-be ghost hunters and skeptics to understand because it shows how easily legend and myth can be mistaken for fact and real events and how easily the lines are blurred between ghost stories that are acknowledged as fictional and "true" stories about ghosts. ■

Why is this obviously fictional story widely regarded as true, or at least based on real events? Largely because the public has often been explicitly told that the story is true by the "original" source …

References

Birnes, William J., and Joel Martin. 2009. *The Haunting of America: From the Salem Witch Trials to Harry Houdini.* New York: Forge.

Hendrix, Grady. 2006. Little ghost on the prairie. Slate.com (May 4). Available online at www.slate.com/?id=2141069&nav=fo.

Hudson, Arthur Palmer, and Pete Kyle McCarter. 1934. The Bell Witch of Tennessee and Mississippi: A folk legend. *The Journal of American Folklore* 47(183) (January/March): 45–63.

McCormick, James, and Macy Wyatt. 2009. *Ghosts of the Bluegrass.* Lexington, Kentucky: University Press of Kentucky.

Monahan, Brent. 2000. *The Bell Witch: An American Haunting.* New York: St. Martin's Griffin.

MonsterTalk podcast. 2011. A Connecticut haunting in a keen author's court (August 10). Available online at http://monstertalk.skeptic.com/a-connecticut-haunting-in-a-keen-author-s-court.

Radford, Benjamin. 2009. The real story behind 'The Haunting in Connecticut.' Live Science.com (March 26). Available online at www.livescience.com/5346-real-story-haunting-connecticut.html.

———. 2010. The White Witch of Rose Hall. In *Scientific Paranormal Investigation: How to Solve Unexplained Mysteries.* Corrales, New Mexico: Rhombus Publishing.

Schager, Nick. 2006. *An American Haunting* (film review). Slant magazine, May 1. Available at www.slantmagazine.com/film/review/an-american-haunting/2133.

Steiger, Brad. 2003. *Real Ghosts, Restless Spirits, and Haunted Places.* Canton, Michigan: Visible Ink Press.

Submissions for the "Skeptical Inquiree" column can be sent to:
Benjamin Radford
The Skeptical Inquiree
P.O. Box 3016 Corrales, NM 87048

Apis
Tinc. Hypericum
Cantharis

MEASURING MYTHOLOGY: Startling Concepts in NCCAM Grants

Driven by misinformation, in 1992 Congress mandated funding of complementary and alternative medicine by establishing an Office at the National Institutes of Health with an initial budget of two million dollars. This office metamorphosed into a center with yearly funding comparable to the National Institutes of Health's well-established research centers. This study examines the last nearly twenty years of grant awards by the National Center for Complementary and Alternative Medicine.

EUGENIE V. MIELCZAREK and BRIAN D. ENGLER

Americans reportedly spend thirty-four billion dollars annually on alternative medicine protocols and products. In 1992 when Congress mandated the funding of an Office to study alternative medicine at the National Institutes of Health (NIH) with a budget of two million dollars, it couldn't have predicted that in 2011 NIH would be funding marketing of "distance healing" and that Americans would be paying for delivery of alternative medicine in their health care bill (Patient Protection and Affordable Care Act 2010).

In 1999, the Office of Alternative Medicine evolved into an NIH center, the National Center for Complementary and Alternative Medicine (NCCAM), whose annual budget now averages $134 million (Atwood 2003) (Figure 1).

Placing the office at the NIH implied a strategy of scientifically studying the medical legitimacy of a growing unregulated industry. But after twenty years, two billion dollars, thousands of funding awards, and hundreds of clinical trials, it's sadly obvious the mandate is flawed. Few realize that funding awards for complementary and alternative medicine (CAM) are not limited to grants from NCCAM. Figure 2 shows the percentage of awards for CAM that has come from other NIH centers and offices.

Using data from the NIH website, we studied all NCCAM funding awards from 2000 to the present.[1,2] We found no discoveries in alternative medicine that justify the existence of the center; Congress has mandated into the health care bill the tax burden of paying for myths and commercial interests.

Billions of taxpayer dollars have been spent on testing botanicals, yoga, magnets, and distance healing as interventions for serious medical problems such as diabetes, HIV/AIDS, and cancer. Grants to naturopathic institutions since 2000 have totaled over thirty-two million dollars. Before reading this survey of NCCAM awards, the reader is invited to test his or her medical per-

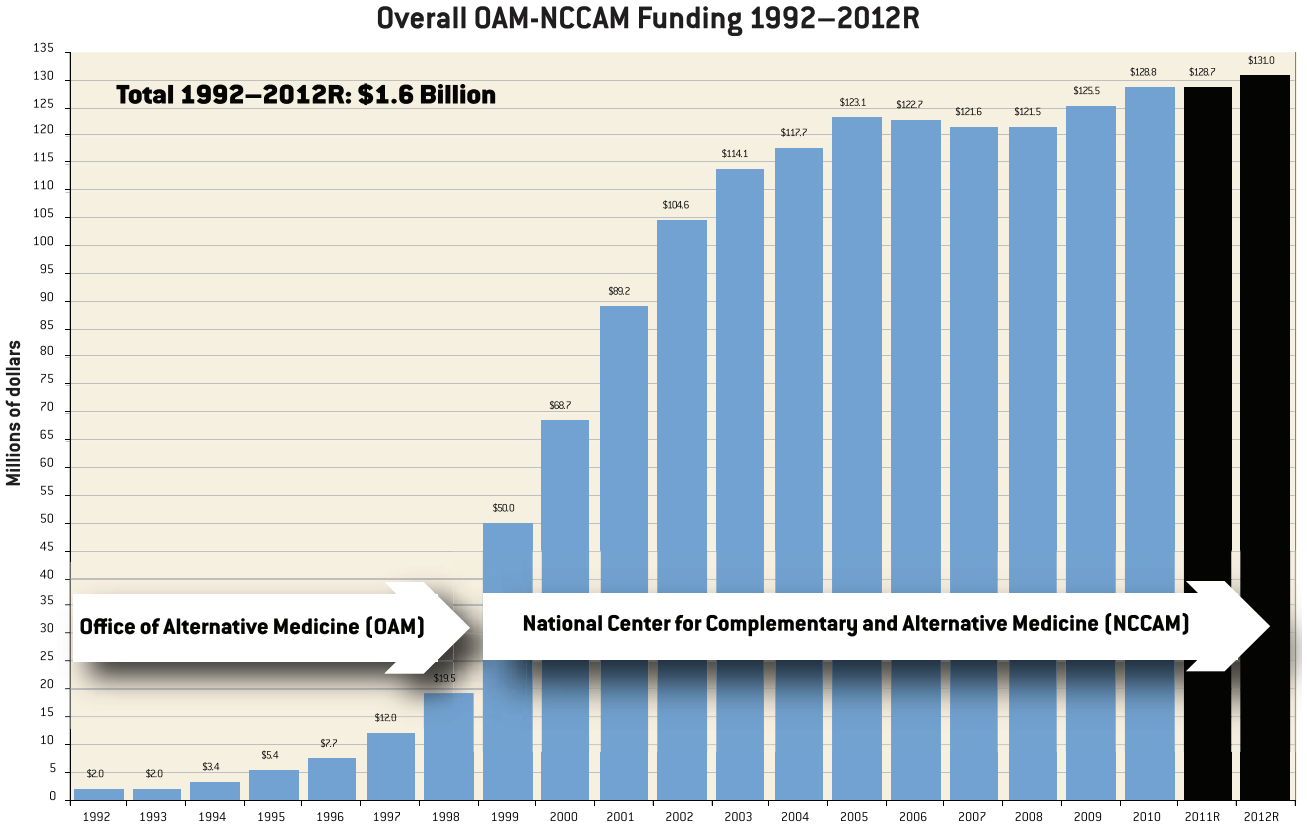


Figure 1: Overall Office of Alternative Medicine (OAM)-NCCAM funding from inception as a congressionally mandated office, OAM in 1992 with initial funding of two million dollars, to its present status as NCAAM and funding of $129 million, a sixty-fold increase.

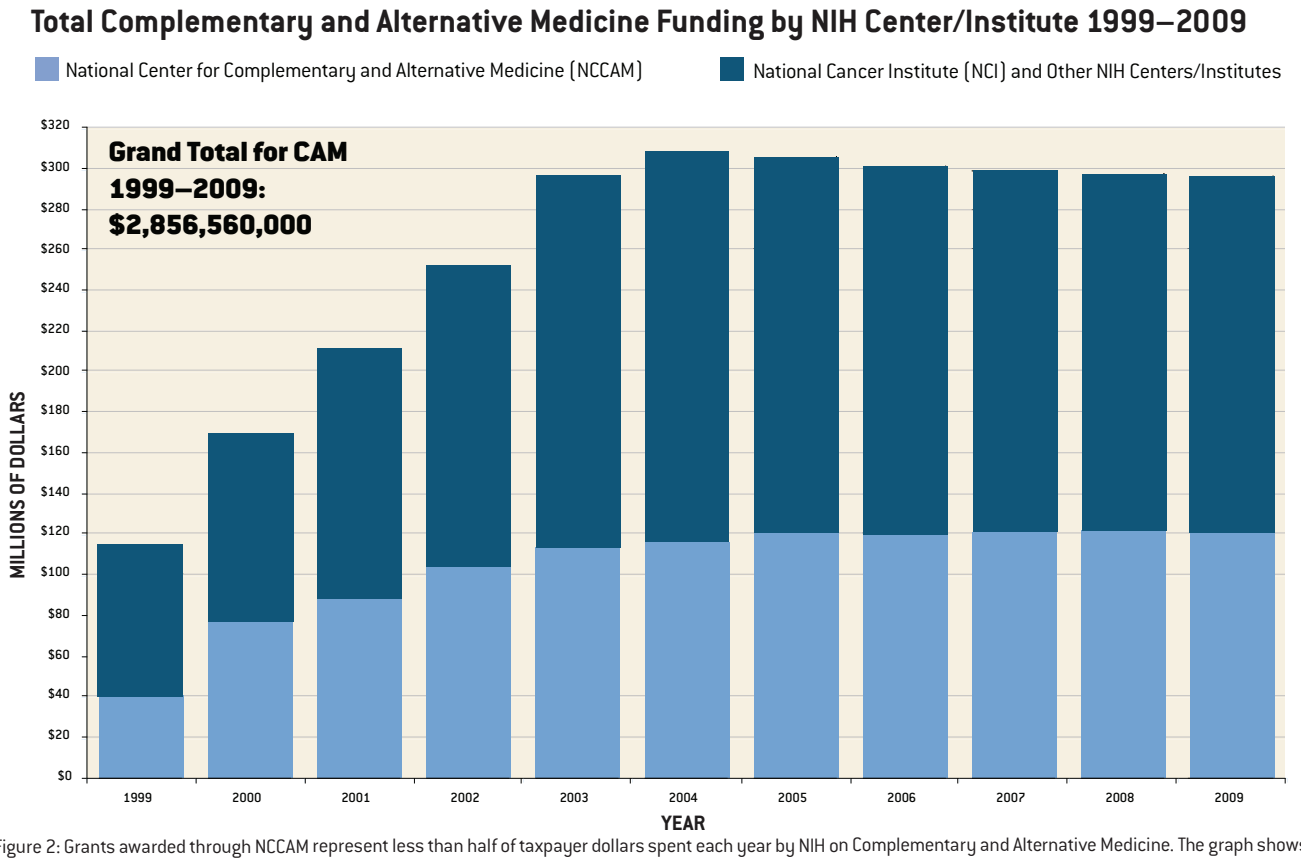


Figure 2: Grants awarded through NCCAM represent less than half of taxpayer dollars spent each year by NIH on Complementary and Alternative Medicine. The graph shows total CAM funding of $2.9 billion spent over the ten-year period through 2009 (the latest year available to the authors via the NCCAM website that breaks out funding by year and by NIH Center/Institute at http://nccam.nih.gov/about/budget/institute-center.htm).

ceptions against those of successfully funded awardees with the quiz on pp. 38–39.

What is most troublesome about this use of taxpayer dollars is the absence of posted results of completed NCCAM clinical trials on the NIH website. Queries to the director of NIH, Francis Collins, on this missing data went unanswered. A taxpayer who searches the NIH project reporter and clinical trials for needed medical information relating to alternative medicine will find startling concepts but few answers about their success. A person who might be facing the scary prospect of legitimate medical chemotherapy, deluged by warm-hearted marketing from alternative medicine via the web and print journalism, is left clueless.

Unsurprisingly, we found some negative results for CAM studies. Did Americans really need to spend millions of dollars to learn that "distance healing" cannot cure brain cancer or HIV/AIDS; shark cartilage does not affect the survival rates of cancer patients; vitamin E and selenium do not mitigate prostate cancer; magnets are not useful for fibromyalgia or carpal tunnel syndrome; and clinical trials using coffee enemas combined with heavy vitamin supplementation for patients with pancreatic or prostate cancer are unsafe? Terminated by an independent oversight monitoring committee was the seven- to twelve-year joint National Cancer Institute and NCCAM study comparing the effects of vitamin E and selenium on prostate cancer. The committee had found a slight (4 percent) increase in prostate cancer for all 32,000 participants. However, this trial is still listed as ongoing.

Worse, some funding awards—such as two million dollars to test magnet therapy and twenty-two million dollars to test distance healing—reveal an ignorance of basic science. From 1995 through 1998, the University of Virginia was funded to study the effect of magnetic mattress pads for sufferers of fibromyalgia. Results of the study concluded "improvements (in pain intensity) did not differ significantly from changes in the Sham group or in the Usual Care group" (Alfano et al. 2001). This conclusion should discourage consumers from purchasing magnets for medical purposes and NCCAM from continuing awarding funds for this intervention. In 1999, Operation Cure All, a law enforcement and consumer education campaign launched by the Federal Trade Commission (FTC), targeted the claims of purveyors of magnet therapy devices and forced them to cease advertising. But despite the FTC's legal actions in 1999 and a successful lawsuit brought by the National Council Against Health Fraud, NCCAM continued to fund magnet therapy. The University of Virginia was awarded $446,000 from 2000–2005 to test the usefulness of pulsed magnetic mattress pads for alleviating arthritis. From 2006 through 2008 over half a million dollars was awarded to the Naturopathic Col-

lege of Natural Medicine in Oregon to test the application of magnets for Carpal Tunnel Syndrome. These latter awardees concluded that despite learning there was no difference in pain intensity for participants assigned to the sham or active magnet groups, they needed further studies to optimize the dosage. In 2007 the University of North Carolina was awarded $283,000 for the clinical trial "Craniosacral Therapy in Migraine," which involved magnets. Expected enrollment was sixty-six. Beth Israel Deaconess Medical Center, a "teaching hospital of Harvard Medical School," received $862,000 from 2000–2006 for "Research and Mentorship in Alternative Medicine," which included magnet therapy. There are no studies conducted by Beth Israel on magnet therapy in the published literature, and Beth Israel's website carries an ambivalent article refusing to acknowledge the impossibility of magnetic healing (Beth Israel Deaconess Medical Center 2010).

The magnets used in mattress pads in carpal tunnel and migraine studies, available commercially from sources such as Nikken, have a field strength of several hundred gauss—about the same strength as refrigerator magnets. Nikken's website makes no claims for medical use of their magnets. As scientific studies and calculations have shown, and the FTC recognized in 1999, blood is not magnetic; therefore, magnets of this strength cannot influence the flow of ions across cell membranes. Thus whether they are located in mattress pads, at the wrists, or surrounding the head, no biochemistry can be initiated or inhibited by these magnets. From 1999 to the present, NIH's NCCAM has awarded millions of dollars for studies for a protocol that has no basis in science. Its website makes no mention of scientific studies and publications by physicists about this fact.[1]

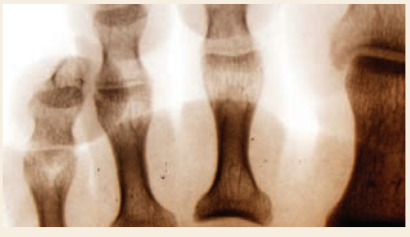
The 1990s misconception about the energy of magnetic fields has a more recent counterpart: the commercial marketing of bracelets that purport to contain holograms that engage a "field" to improve athletic ability. This marketing is so successful that the company, Power Balance, could afford to purchase nam-

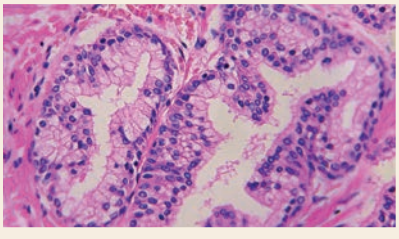
CONDITIONS vs. INTERVENTIONS: Can You Match Them?

For nearly twenty years, NIH's Center for Complementary and Alternative Medicine, NCCAM, has awarded funds totaling nearly two billion dollars to test interventions based on popular concepts such botanicals, distance healing, magnets, and acupuncture for medical conditions such as migraine, cancer, diabetes, HIV/AIDS, and multiple sclerosis. Test your ability to match a few of these medical conditions with the intervention NCCAM has supplied funds to test; choose a medical condition and match it with one or more intervention. Answers on on p. 43.

MEDICAL CONDITION

1. Atherosclerosis—accumulation of cholesterol on artery wall
2. Brain Cancer—glioblastoma
3. Carpal Tunnel Syndrome
4. Cervical Cancer
5. Breast Cancer
6. Diabetes
7. Fibromyalgia
8. Hepatitis C
9. HIV/AIDS
10. Migraine
11. Multiple Sclerosis
12. Prostate Cancer
13. Rheumatoid Arthritis
14. Wound Healing
15. Head and Neck Cancer
16. Cardiovascular disease
17. Temporomandibula Joint disorder—frozen jaw





ing rights to the National Basketball Association Stadium in Sacramento, California. (For more on Power Balance bracelets, see "Power Balance Bracelets a Bust in Tests" on page 14.)

Not only have magnetic fields entered the NCCAM funding curriculum, but millions of dollars have been awarded for studies about the mythic "biofields" generated by Reiki, Therapeutic Touch, and Qigong. These protocols prescribe moving hands above a patient's body in a specialized set of motions that are supposed to initiate a cure of the medical condition. Use of these motions in a hospital trauma center can be seen on the Internet (Donnell 2010). The positioning differs slightly among these protocols but essentially involves an evocation of an undefined, unmeasured "energy field" that is purportedly emitted from the hand of the practitioner and interferes with an equally undefined field of the patient. Interestingly, accidental reverse motions that might leave the patient sicker are never mentioned. One recipient of an NCCAM grant to study the efficacy of Therapeutic Touch, Gloria Gronowicz, was asked in July 2008 by a *Hartford Courant* reporter (Waldman 2008), "Should somebody with osteoporosis or a broken leg go 'to their Reiki practitioner?'" Gronowicz replied, "We don't know." The majority of the clinical trials associated with these "biofield" awards, which include prostate cancer, fibromyalgia, cervical cancer, and coronary artery disease, have been completed but few posted their results on NIH's official website (Figure 3).

Some grants to study the efficacy of this "hands off" healing did not require clinical trials; they involved animals. A licensed Reiki practitioner at the Cleveland Clinic received over a quarter of a million dollars (from 2002–2003) to study the "Effects of Energy Healers" on ". . . cholesterol-fed rabbits." The project description reads ". . . Specific Aims of the present application are: 1) to evaluate the possibility that energy healing treatments may decrease the progression of atherosclerosis in a rabbit model of cholesterol-induced atherosclerosis. . . ." No results of the studies on these fatty rabbits can be

For illustration only; not all therapies depicted are represented in the text

INTERVENTION

A. Herbs

B. Expressive writing

C. Prayer, a form of distance healing

D. Mushroom extract

E. Shark cartilage

F. Pulsed magnetic fields

G. Selenium plus vitamin E

H. Static magnetic fields

I. Therapeutic touch, a form of distance healing

J. Soy compounds

K. Reiki, a form of distance healing

L. Mistletoe

M. Acupuncture

N. Flaxseed

O. Shamanism

P. Milk thistle

Q. Vedic medicine

Some scientists are alarmed at the growth of national misconceptions associated with these distance healing protocols. The Division of Biological Physics of the American Physical Society has endorsed a statement of its concerns on the use of distance healing …

found in the published literature.

Seventy-two grants have been awarded for interventions using Reiki, Therapeutic Touch, and Qigong. Courses licensing these practitioners are offered by integrative medicine clinics, and in some institutions they are an elective part of medical school education. Respected medical clinics and academic institutions offer courses in CAM protocols.[3] The website of the Qigong Institute in California features a list of NIH awards for Qigong and Energy Healing Research (Qigong Institute, n.d.). Readers can check with their local hospital or medical school to receive these treatments, which can be covered by the current health care bill.

Some scientists are alarmed at the growth of national misconceptions associated with these distance healing protocols. The Division of Biological Physics of the American Physical Society has endorsed a statement of its concerns on the use of distance healing: "[The division] deplores the misuse of the term *energy* to mislead and defraud the public by improperly validating scientifically unsubstantiated healing protocols." NCCAM has awarded grants totaling $11 million for these protocols.

Awards for medical intervention by distance healing came with other options. From 2000–2002, $417,000 was granted to the California Pacific Medical Institute for "distant healing" of AIDS by nurses and "healers" who prayed for patients. The awardees published one of the few definitive results associated with NCCAM grants. It concluded: "Distant healing or prayer from a distance does not appear to improve selected clinical outcomes in HIV patients who are on a combination antiretroviral therapy" (Astin et al. 2006).

Additional awards for healing by prayer: $823,000 to study effect of prayer on glioblastoma and $337,000 in 2003 for a clinical trial to study the efficacy of distance healing on wounds resulting from breast reconstruction surgery. No results are available for either of these awards.

One of the awardees, Elizabeth Targ, was a psychiatry professor at the California Pacific Medical Center in San Francisco. She died in 2002 at age forty-one of glioblastoma, a brain tumor, while conducting this NCCAM study into the efficacy of prayer on patients with the same cancer. In addition to being a founder-director of the Complementary Medicine Research Institute at the California Pacific Center, Targ was a research fellow at the Institute of Noetic Sciences, a group that promotes paranormal concepts.

Besides examining funding of "interventions," we scrutinized awards for treatments intended to mitigate HIV/AIDS, diabetes, prostate cancer, and heart disease.

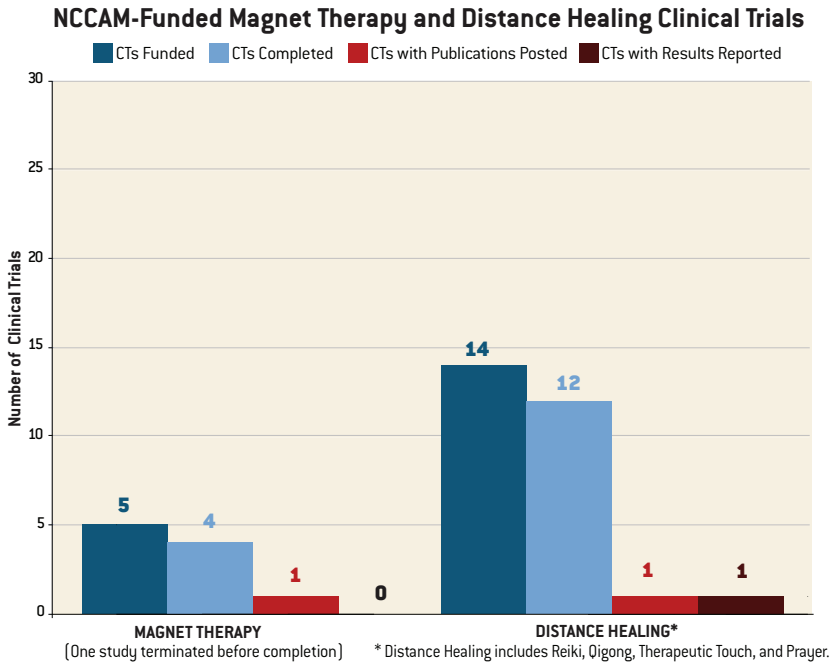


Figure 3: Clinical trials for two interventions. Nineteen funded clinical trials for magnets and distance healing, protocols that have no basis in physical laws. Of the originally funded nineteen trials, sixteen were completed (from 2000 to 2009). These involved 1,943 persons. Only two publications published the study and only one result was posted. Additional awards from 1995 to 1998 by OAM (NCCAM's predecessor) for testing magnetic mattress pads (funding unknown) involved 111 persons with fibromyalgia.

In addition to funding prayer and Reiki healing protocols for HIV/AIDS, as part of an NIH multicenter effort NCCAM has contributed over three million dollars since 2000 for a study in South Africa documenting the safety of a widely used indigenous mushroom extract as a marker of this disease's progression (see Figure 4). The study reports that the extract is tolerated and its recruitment of sixty participants is continuing. There are no interim reports on its effectiveness.

Between 2000 and 2011 NCCAM has provided $105 million for Complementary and Alternative Medicine (CAM) research for diabetes. These dollars were allocated across 362 projects. One of the trials, listed as completed in 2009, studied whether expressive writing would reduce stress and diabetic symptoms. As far as we can determine from public records, the total funding was $106 million, about half of which came from NCCAM. Another trial, costing $390,000, tested whether Maharishi Vedic Medicine could be an effective supplement in controlling type 2 diabetes. No results are available from either of these trials. Other diabetes trials featured vitamin C, Reiki, and Glucosamine. Glucosamine received a "thumbs down"; the results for the vitamin C and the Reiki trial are unknown. One trial, centered at Griffin Hospital at Yale University, reported, "Chromium supplementation was unlikely to attenuate diabetes risk" (Ali et al. 2011).

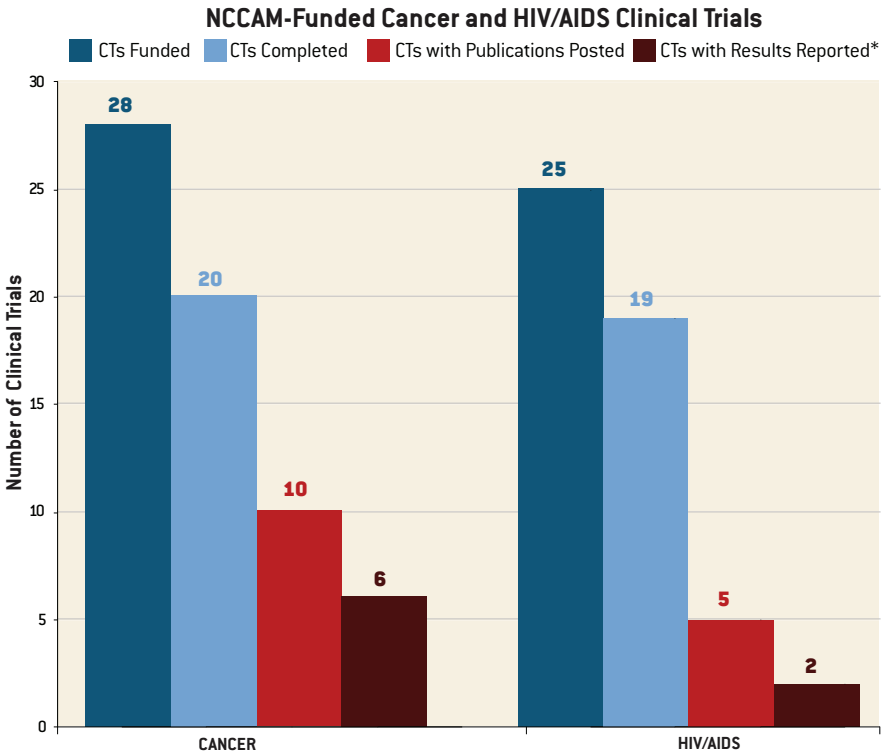
Healthy promises for soy consumption are a constant on the consumer horizon. NCCAM funded 111 soy awards (from 2000–2010) totaling $54 million. One result from Purdue University reported that soy did not significantly affect calcium metabolism and did not promote bone loss or calcium absorption in postmenopausal women (Spence 2005). A set of clinical trials (between 2000 and 2005) on the use of soy for treating several types of cancer was also completed, but their results have not been reported.

Acupuncture is a popular alternative protocol. NCCAM funding grants for acupuncture over eleven years, 2000–2011, have totaled $78 million (240 grants for fifty-eight clinical trials), with one posted result that published no conclusion on the efficacy of this intervention for depression. In a recent publication in the peer-reviewed medical journal *Pain*, Ernst et al. (2011) studied the literature since 2000, across all languages, and concluded that "numerous systematic reviews have generated little truly convincing evidence that acupuncture is effective in reducing pain." The paper also reported on adverse effects of the protocol.

Funding for botanicals totals about seventy-two million dollars. Many results are far from earth-shattering; Gingko Biloba does not work for preventing Alzheimer's or dementia; lemon and lavender oils don't affect immunological responses.

"Mind-body medicine," a heartwarming catch phrase implying personal control over medical problems, appears throughout NCCAM project descriptions. We found it in six hundred funding awards (totaling $157 million). The mind-body mantra coupled with yoga embraced a subset of fifty grants totaling $11 million.

Among the more startling concepts in the investigation of "mind-body medicine" were grants (of $351,000) for "Transfer of Neural Energy Between Humans" to Bastyr, a college of naturopathic medicine, to test whether "a conscious state could exert biological effects at a distance" (Standish et al. 2004). "Thirty seven (37) females and 23 males (n=60; 30 pairs) participated in the study. The subjects were in separate rooms 14.5 meters apart. …Subjects knew each other well and claimed to have previous experience of being emotionally/psychologically connected to one another." Reported results of the clinical trial were based on data from four of the thirty pairs of subjects (four women paired with one man). However, when the experi-



* No results were specifically reported on the ClinicalTrials.gov's website, but some results were gleaned from a review of study-related publications.

Figure 4: Clinical trials for two serious medical conditions. Fifty-three clinical trials for cancer and HIV/AIDS from 1998–2009 involved over 5,200 persons. No results were posted on ClinicalTrials.gov for any of the twenty completed trials in cancer. Publications were linked to only ten of these twenty-eight cancer studies. A literature search by the authors located some conclusions in six of them.

Ratcheted up by mandated coverage of alternative medicine in the health care bill, America's thirty-four-billion-dollar alternative medicine industry is poised to take advantage of the congressional mandate.

ments were repeated, "only one pair replicated the effect." The authors concluded, "These results indicate that in some pairs of human subjects a signal may be detected in the brain of a distant member of the pair when the brain of the other member is visually stimulated."

A second publication based on MRI imaging response of this matched pair came to a similar conclusion (Richards et al. 2005). Nowhere in the original grant is there any acknowledgment that the Visually Evoked Potentials (VEP) are on the order of microvolts. Thus in another room 14.5 meters away this signal would be reduced by a factor of several hundred. Any information transfer from an optically stimulated EEG signal in a subject 14.5 meters away would clearly be a nonhuman adaptation. A simpler and more cost effective experiment could have been measurement of an auditory evoked potential—two sound-proof rooms 14.5 meters apart with the signal being the human voice transferring information to a recipient with head muffs and electrodes attached to his skull. If this pair is truly specially endowed, then they should enjoy careers at Blackjack tables in Las Vegas and be eligible to win the James Randi Educational Foundation's Million Dollar Paranormal Challenge.

Not deterred by lack of evidence, NCCAM engages in both subliminal and direct marketing for CAM. Subliminally, through awards totaling twenty million dollars for development of CAM curriculum in medical schools. A study of these awards published in 2009 in *Academic Medicine* (Marcus and McCullough 2009) concluded that these curricula fail to meet the generally accepted standards of evidence-based medicine. Examples of direct marketing are grants to institutions, such as the Cleveland Clinic, and individuals. Although there is scientific acknowledgment that distance healing is not a valid medical intervention, nevertheless in 2010 NCCAM awarded a Fort Worth consultant for "large corporations and small businesses" $188,000. His aim was "to build, test, and disseminate an Internet-based wellness program that gives instruction, guidance, and social support for the self-care practice of Qigong."

Congressional misconceptions continue to drive the industry and place a veneer of respectability on CAM. In June 2011, Senator Bernie Saunders (I-VT) sponsored a conference on Complementary and Alternative medicine—"Taking Control of Your Health"—featuring speakers and workshops offering complimentary hands-on sessions. The director of NCCAM, Josephine P. Briggs, MD, was a featured speaker.

Ratcheted up by mandated coverage of alternative medicine in the health care bill, America's thirty-four billion dollar alternative medicine industry is poised to take advantage of the congressional mandate. State licensed health care practitioners such as chiropractors are adding acupuncture and distance healing to their practices. NIH has fueled the process by using federal funds for grants for market plans for the industry.

On June 13, 2011, Lawrence Lindner reported in the *Washington Post* that Congress has proposed ending a program providing federal funding to train 40 percent of pediatricians and pediatric specialists. The pediatric resident training program, which costs $300 million, has been in place since 1999, almost as long as congressional funding for alternative medicine, a program that is not being scrutinized by Congress or the administration.

After nearly twenty years of funding, a paucity of reported results for clinical trials, and no discoveries that would lead to new areas of scientific medical research or treatment, it is surprising that Congress has not recognized that taxpayers are funding a fruitless endeavor. ■

Acknowledgments

The authors wish to acknowledge help from the *Independent Investigations Group Washington DC*[4] and the librarians, IT services, students, and faculty at George Mason University. However, the views expressed here are solely those of the authors.

Notes

1. Recent publications relating to this subject by the author include:

Eugenie Mielczarek and Derek Araujo. 2011. Power lines and cancer, distant healing and health

care." Skeptical Inquirer 35(3) (May/June): 40–44.

Eugenie Mielczarek. 2010. Magnetic fields, health care, alternative medicine and physics. *Forum on Physics and Society Newsletter* (April). Available online at www.aps.org/units/fps/newsletters/201004.

Eugenie Mielczarek and Derek Araujo. 2009. A fracture in our health care: Paying for non-evidence based medicine (September 28). Available online at Paying_for_Non-Evidence_Based_Medicine.pdf.

Eugenie Mielczarek. 2010. Fields, alternative medicine and physics (blog post). *Science-Based Medicine* (May 27). Available online at www.sciencebasedmedicine.org/?cat=11.

2. Data from grants and clinical trials referred to in this paper can be accessed online at http://projectreporter.nih.gov/reporter.cfm and http://clinicaltrials.gov/.

3. Examples of institutions that give false respectability to integrative medicine:

Brigham and Women's Hospital (affiliated with Harvard University; www.brighamandwomens.org/default.aspx)

Cleveland Clinic Wellness Institute (http://my.clevelandclinic.org/departments/integrativemedicine/default.aspx)

Scripps Institute (www.scripps.org/services/integrative-medicine)

University of Michigan (www.med.umich.edu/umin)

4. Independent Investigations Group Washington DC (http://iigdc.org/).

References

Alfano, Alan P., Ann Gill Taylor, Pamela A. Forseman, et al. 2001. Static magnetic fields for treatment of fibromyalgia: A randomized controlled trial. *Journal of Alternative and Complementary Medicine* 7(1): 53–64.

Ali, A., Y. Ma, J. Reynolds, et al. 2011. Chromium effects on glucose tolerance and insulin sensitivity in persons at risk for diabetes mellitus. *Endocrine Practice* 17(1) (January/February): 16–25.

Astin, John A., Jerome Stone, Donald Abrams, et al. 2006. The efficacy of distant healing for human immunodeficiency virus—results of a randomized trial. *Alternative Theories in Health Medicine* 12(6) (November/December): 36–41.

Atwood, Kimball. 2003. The ongoing problem with the National Center for Complementary and Alternative Medicine. Skeptical Inquirer 27(5)(September/October): 23–29. Available online at www.csicop.org/si/show/ongoing_problem_with_the_national_center/.

Beth Israel Deaconess Medical Center. 2010. Magnet therapy. Available online at http://bidmc.org/yourhealth/conditionsaz.aspx?chunkid=33778.

Donnell, R.W. 2010. Reiki at Baltimore trauma center (January 29). Available online at http://doctorrw.blogspot.com/2010/01/reiki-at-baltimore-shock-trauma-center_356.html.

Ernst, Edzard, Myeong Soo Lee, and Tae-Young Choi. 2011. Acupuncture: Does it alleviate pain and are there serious risks? A review of reviews. *PAIN* 152(4): 755–64.

Marcus, Donald, and Laurence McCullough. 2009. An evaluation of the evidence in 'evidence-based' integrative medicine programs. *Academic Medicine* 84 (9): 1229–34.

Patient Protection and Affordable Care Act: Pub. L. 111–48, 124 Stat. 119 Sec 2706. March 23, 2010.

Qigong Institute. N.d. List of NIH grants for Qigong, Zen, Taiji, and Reiki. Available online at www.qigonginstitute.org/html/usgovernment.php.

Spence L.A., E.R. Lipscomb, J. Cadogan, et al. 2005. The effect of soy protein and soy isoflavones on calcium metabolism in postmenopausal women: A randomized crossover study. *American Journal of Clinical Nutrition* 81(4)(April): 918–22.

Standish, L.J., L. Kozak, L. Clark Johnson, et al. 2004. Electroencephalographic evidence of correlated event-related signals between the brains of spatially and sensory isolated human subjects. *Journal of Alternative & Complementary Medicine* 10(2)(April): 307–14.

Richards, Todd L., L. Kozak, L. Clark Johnson, et al. 2005. Replicable functional magnetic resonance imaging evidence of correlated brain signals between physically and sensory isolated subjects. *Journal of Alternative & Complementary Medicine* 11(6): 955–63.

Waldman, Hilary. 2008. The right touch: A hint of hands-on healing. *Hartford Courant* (July 28). Available online at http://articles.courant.com/200807-28/news/healing-toart_1_healing-touch-therapeutic-touch-therapies.

Eugenie V. Mielczarek is emeritus professor of physics at George Mason University.

Brian D. Engler is a retired US Navy Commander; his fields of study are operations research and business administration.

This article is the result of their study of federal funding for alternative medicine from NIH's National Center for Complementary and Alternative Medicine.

Answers to Quiz

The correct answers with grant or clinical trial identifiers (in parentheses):

1. k **Atherosclerosis**, Reiki (1R21AT001100-01)

2. c **Brain Cancer-Glioblastoma**, distance healing prayer (NCT00029783)

3. h **Carpal tunnel syndrome**, static magnetic fields (NCT00521495)

4. i **Cervical Cancer**, therapeutic touch NCT00084123

5. e, n **Breast Cancer**, shark cartilage (NCT00026117), flaxseed (NCT00612560)

6. b, q **Diabetes**, expressive writing (NCT00233142), Vedic medicine (NCT 00065650)

7. h **Fibromyalgia**, static magnetic fields (1F31AT000058)

8. a, p **Hepatitis C**, herbs (NCT00010816), milk thistle (NCT00030030)

9. c, d **HIV/AIDS**, prayer (NCT00079534), mushroom extract (NCT00376415)

10. h **Migraine**, static magnetic fields (NCT00665236)

11. g **Multiple Sclerosis,** selenium plus vitamin E (NCT00010842)

12. k, g, j, l **Prostate Cancer**, Reiki (NCT00065208), selenium plus vitamin E (NCT00006392), soy compounds (NCT00200824), mistletoe (NCT00049608)

13. f **Rheumatoid Arthritis**, pulsed magnetic fields (NCT00110565)

14. c **Wound Healing**, prayer (NCT00067717)

15. m **Head and Neck Cancer,** acupuncture (NCT00797732)

16. m **Cardiovascular disease**, acupuncture (NCT00032422)

17. o **Temporomandibular Joint Disorder,** shamanic healing (NCT 00071474)

Laughing Goats and Scowling Sheep
Humor in Paranormal Discourse

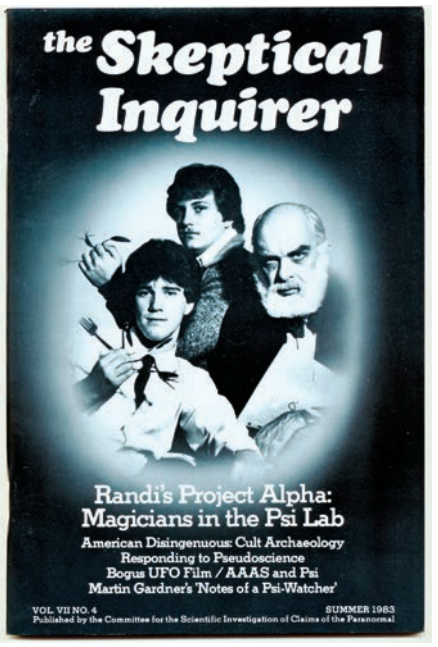
Humor, properly used, can be a very powerful way for skeptics to get their points across.

JONATHAN C. SMITH

Project Alpha is perhaps one of the most famous and elaborate instructive practical jokes played on paranormal researchers. From 1979 to 1983, two magicians, Steve Shaw and Mike Edwards, persuaded a team of scientists at the McDonnell Laboratory for Psychical Research that they possessed remarkable psychic powers, including bending spoons with their minds, identifying pictures in sealed envelopes, and magically creating pictures inside cameras. These "powers" were then demonstrated in 160 hours of experiments. However, unknown to the researchers, the project was the invention of James Randi, who trained his student magicians to deceive the researchers. The practical joke succeeded, in spite of warnings and specific caveats written by Randi himself to the program director, James McDonnell. When revealed, the hoax (Randi 1983a, 1983b) rocked the paranormal research community, received extensive publicity in the popular press[1], and to this day serves as a valuable instructive tool in courses on research methodology. Indeed, I am willing to speculate that Project Alpha may well represent the most effective application of instructive humor in the history of paranormal research. (Let me suggest that, in honor of James Randi, when equally ambitious attempts at instructive humor are attempted, they be designated "Alpha-Level" interventions.)

Project Alpha is only one of many examples of instructive humor deployed by paranormal skeptics. For others, one only need view a handful of episodes of Penn and Teller's television series *Bullshit!* These magicians have fooled upscale restaurant patrons into savoring exotic bottled water (actually pumped from an outdoor garden hose), teased blindfolded mediums with upside-down Ouija boards, and provided alternative medical relief to pain patients using absurdly enormous fake horseshoe magnets. Each stunt is presented with respect and with a full explanation of the critical thinking principles it illustrates. To these I add numerous journalistic accounts, exposés, satires and parodies, hoaxes, and tests with humorous effect.

Learned professors are not above the application of instructive humor. In 1948 psychologist Bertram R. Forer (1949) gave his students an apparent personality test and later distributed the resulting personality profiles. Students were quite impressed with the results, giving the test an average accuracy rating of 4.26 (0 = "very poor," 5 = "excellent"). Of course, all profiles were exactly the same: a generic reading pasted together from random horoscopes. The "Forer" test is now a classic, used in hundreds of classrooms each year to demonstrate the "Forer" effect (seeing a statement as personally valid even though it could apply to anyone).


the Skeptical Inquirer
Randi's Project Alpha:
Magicians in the Psi Lab
American Disingenuous: Cult Archaeology
Responding to Pseudoscience
Bogus UFO Film / AAAS and Psi
Martin Gardner's 'Notes of a Psi-Watcher'
VOL. VII NO. 4
SUMMER 1983
Published by the Committee for the Scientific Investigation of Claims of the Paranormal

Each of these demonstrations and tests is also an example of instructive humor (students invariably respond to Forer's test with laughter). Each politely makes a point about critically interpreting paranormal claims. Instructive humor can be a very powerful tool in the hands of a skilled practitioner.

Instructive Humor in Context

Those who dare engage in critical discourse over paranormal claims may quickly discover at least three approaches. I am not referring to the traditional Biblical (Matthew 25:31–46) groupings of sheep (blessed believers) and goats (condemned skeptics) or to ostriches (my own unbiblical addition). We are considering something new—*neutral criticism*, *subjective relativism*, and *instructive humor*.

Neutral criticism. This, of course, is the preferred stance for scholarly publication. One presents arguments in a dry and straightforward way without the injection of humor. Ironically, in my experience, when manuscripts are submitted for consideration for publication, reviewers use aggressive humor and even sarcasm without mercy. But articles that

survive this brutal gauntlet are often painfully humorless.

Subjective relativism. Although variously defined, subjective relativism is often viewed as a philosophical perspective that reality is personal, created by our beliefs, and your beliefs and realities are just as valid as mine. As a critical perspective, subjective relativism not only views paranormal and skeptical claims neutrally but presents them as having equal merit. This may seem quite fair and balanced; however, it opens the door to considerable mischief. Specifically, it permits one to insist that we "consider the controversy" and elevate a questionable claim to the same status as the fact-based claim it contradicts.

The most blatant example is the strategy of creationists to inject creation theory from the book of Genesis into high school biology classes by framing it as "another theory." We see a similar ploy in one classic textbook on parapsychology. In discussing the spoon-bending claims of Uri Geller, Irvin and Watt (2007) conclude, "The authenticity of Geller's performance is a matter of *much debate*" (emphasis added, p. 119). One viewing of a famous instructive and humorous test performed by the late Johnny Carson on Geller suggests otherwise (Google "Geller Johnny Carson"). Remarkably, "fair and balanced" reviews occasionally grace the pages of top psychological journals and books, even with respect to classic and highly regarded works on complementary and alternative medicine (Field 2008; Krippner 2002; Krippner and Achterberg 2000) or the psychology of religion (Azar 2011).

Subjective relativism can be a science killer. If all perspectives are valid and subjective, then any paranormal finding can be embraced as "just one way of looking at things." Worse, the relativist can conjure up new, "equally valid" rationalizing scenarios, such as the suggestion that the negative energy, or negative realities, evoked by skeptical researchers inhibit the emergence of paranormal phenomena. Given their rich store of alternative ad hoc explanations, subjective relativists can readily dismiss a strong negative finding with the caveat "the jury's still out." I suspect subjective relativism is also a humor killer. If every perspective is as valid as the one you cherish, joking criticism becomes impolite, even intolerant.

Instructive humor. Humor can achieve a lot with a simple laugh. It grabs attention, disarms reflexive rigidity, and makes a point. Perhaps you have carefully considered a paranormal claim and have decided there is enough evidence to make a reasoned conclusion, concerning both methodology and results. Critics fail to listen to your observations. With exasperation, you resort to humor to break the ice and make your point. To illustrate, in class I find students persist in patterns of distorted thinking until shocked into wakefulness by humor and satire—perhaps a lecture from James Randi or an episode of Penn and Teller's *Bullshit!* series.

But humor has its risks. Even a gentle, mirthful tickle can provoke an indignant cacophony of bleating and whining. Elsewhere (Smith 2010), I have cataloged the pained complaints of bruised flocks of paranormal researchers, including accusations that skeptical scholars are "inflexible," "deceitful," "subversive," suffering "low self-esteem," "prejudiced," unconsciously "afraid" of psi, "scientistic," and "fundamentalistic." Many no longer stoop to consider the criticisms of skeptics, contributing to a "dialogue of the deaf" (Alcock 2003). It is incumbent on the skeptical humorist to pick wisely from the quiver and aim carefully. For some paranormal researchers, quiet reason may no longer open the door. Major Alpha-Level intervention may be required.

A good exposé not only grabs our attention, it teaches a lesson. The world of the paranormal has had more than its share of amusing frauds; indeed, more than one area of study has been launched by a fraud.

The Humorist's Handbook

Here are five types of humor I have found most useful:

1. *Humorous story*. By far the most frequent application of instructive humor is the simple journalistic account of a paranormal advocate or incident. It is truly remarkable that the universe of the paranormal is replete with the weird, wild, and wonderful. Simply examine the life stories of current popular advocates of specific claims, the reported manifestations of paranormal phenomena, and historical origins of specific paranormal claims. I propose that ghost-hunter researchers and their ventures are far more colorful than studies of the genetic markers of evolution. The history of research on the afterlife provides a richer store of humor than the history of research on mathematical models of disease contagion.

Skeptical journalists sometimes take delight in describing the foibles and pratfalls of paranormal researchers. For an excellent example, see Mary Roach's *Spook* (2005), a hilarious bestselling book outlining the history of research on the afterlife. Quality journals of skeptical inquiry and critical thinking, such as the SKEPTICAL INQUIRER, offer a ready outlet for instructive and amusing stories and anecdotes. And of course, the extensive life work of James Randi presents a burgeoning library of humorous stories of things paranormal.

These stories are not mean-spirited attacks used by desperate skeptics with weak arguments. Instead, the universe of the paranormal is its own best source of amusement, which when documented can provide vivid demonstration of the clumsy avoidance or misapplication of the tools of critical thinking. Unfortunately, when journalists entertain us with tales from beyond, they may fail to articulate the lessons to be learned.

2. *Amusing Exposé of Foolery and Fraud*. A good exposé not only grabs our attention, it teaches a lesson. The world of the paranormal has had more than its share of amusing frauds; indeed, more than one area of study has been launched by a fraud. Consider the Fox sisters, whose secret foot thumps captivated early research on medium communication; the five teenage girls who tricked degreed professionals of the Society for Psychical Research (in its first scientific study) into believing their youthful psi abilities to guess cards and people's names; or Lady Wonder, a sensational psychic horse that amazed J.B. Rhine, one of the founders of ESP research. And then there is Houdini, who made a career of exposing fraudulent psychics.

These exposés are worthy, even heroic, instructions. However, I cannot resist sharing the shocking double exposé of Swiss psychiatrist Elizabeth Kübler-Ross. In the waning decades of the twentieth century, Kübler-Ross was famous for helping popularize near-death experiences, out-of-body experiences, and the five stages of dying (Denial, Anger, Bargaining, Depression, and Acceptance). Many of her ideas still illuminate New Age and counterculture websites and lesser university programs in psychology and education. However, her career as a mainstream psychologist started to flounder after an odd double exposé at a Kübler-Ross retreat on death and dying for grieving widows. A turban-wearing male medium enabled widows to communicate directly with the dear departed—in a dark room, through sex. During one conjugal visit, the lights were accidentally turned on, exposing the naked medium (still wearing his turban). A subsequent exposé revealed that several widows came down with identical vaginal infections (Smith 2010), an unfortunate fact that doused with cold water any post hoc rationalizations that the naked escort was actually an accommodating clone of afterlife husbands.

3. *Satire/Parody*. The point of satire, and also often of parody, is to amuse through imitation while making a point. My favorite paranormal parodies and satires are the faux religions, such as the Church of the Flying Spaghetti Monster (original and Reformed Pastafarian; Smith 2011) and the church of the Invisible Pink Unicorn. To these I would add the Pigasus Awards, presented by James Randi to the year's most dubious paranormal claim, scientist, funding grant, media presentation, or performer or the most egregious example of refusal to accept reality.

4. *Hoax/Practical Joke*. Project Alpha wins the prize. It amused and taught.

5. *Reductio ad Absurdum*. As typically and somewhat casually applied, this clumsy Latin logistical concept refers to the merciless elaboration of all the absurd implications of a paranormal claim. A frequently cited example: if psychokinetic thoughts can influence the movement of physical objects, then gambling psychics should put casinos out of business.

How to Make a Joke

What is the best way to use instructive humor? First, those who use instructive humor should be willing to accept a clear and unambiguous piece of evidence for the paranormal. We should be willing to laugh at ourselves, especially when Mother Nature tosses a cosmic pie in our faces.

However, I wish to focus on an issue that is considerably more important: Explain your point. Two major articles, both unusual jokes that remarkably have made it into staid and respected professional journals, highlight this essential lesson.

In 2007 Leonard Leibovici, a highly

respected and hard-nosed medical researcher, astonished the medical community by publishing a study on the impact of retroactive intercessory prayer on serious blood infections (2001). Specifically, he obtained the medical files of 3,393 patients hospitalized four to ten years previously. The files were randomly divided into two groups, one of which received a short prayer requesting full recovery and well-being. The patients, being in the past, were unaware that they were the recipients of prayer. When Leibovici analyzed the files for both groups, he found that the prayer group had spent significantly less time in the hospital and had infections of shorter duration. The study, which was published in the prestigious *British Medical Journal*, was not a fabrication and was indeed completed. Only careful reading of Leibovici's other writings reveals that he was trying to make a humorous point concerning the misuse of statistics in paranormal research: that use of large numbers can produce spurious results and that we should be suspicious of results that challenge the existing body of data supportive of the prevailing world view. But this was not explained in the actual article.

The Leibovici study is an excellent example of instructive humor in science. However, it illustrates another important point: if you use humor to make a point concerning paranormal research, explain what that point is—especially if you dare to publish it in a serious scholarly journal. Leibovici failed to do so; indeed, one has to do a fair amount of detective work to figure out what he was up to. Because the point was not effectively made, his study frequently appears in the paranormal literature—not as a cautionary example of the misuse of statistics but as supportive evidence for retroactive causality (perhaps mediated by a spooky brew of tachyon particles and dark matter quantumly entangled in a wormhole). It is even presented as evidence for the existence of God. Skeptics have ignored the study, missing an opportunity to illustrate the need for research rigor.

Contrast Leibovici's tongue-in-cheek article with a similar but more successful attempt to inject humor into a serious scholarly publication. In 1996 Alan Sokal fooled the prestigious professional journal *Social Text* into publishing as a serious article his technobabble spoof, "Transgressing the Boundaries: Towards a Transformative Hermeneutics of Quantum Gravity." This parody is so good that it provides a more convincing quantum-based rationale for parapsychology than currently popular notions of quantum consciousness. But it is deliberate nonsense. Unlike Leibovicki, Sokal (2010) has made every attempt to explain the lesson of his instructive humor (even learned professionals can be fooled by papers that contain jargon and "flatter the editors' ideological preconceptions" about the subjective and relative nature of "physical reality").

Beyond the Joke

Leibovici and Sokal reveal two important caveats about using instructive humor:

1. Carefully explain your point and why you are using humor.
2. Invite your audience to engage in a dialogue about what constitutes good evidence, the rules of the game of science, and the criteria for clear critical thinking.

Leibovici failed to do this and so his work has been misinterpreted, misused, and ignored. Sokal succeeded, and his effort has received the attention it deserves. Indeed, I would vote to designate it an Alpha-Level intervention.

In conclusion, there are far more books and articles by paranormal believers than skeptics. Yet skeptics are far more likely to deploy humor. Do goats laugh while sheep scowl? Or perhaps when believers dig past the humor of skeptics, they discover a criticism that may have merit. Get past the laboratory practical psychic jokes of James Randi (or the fancy bottles of fake bottled tap water, upside-down Ouija boards, and gigantic qi-magnets of Penn and Teller), and you find a message that is worth our most serious attention. ■

References

Alcock, J.E. 2003. Give the null hypothesis a chance: Reasons to remain doubtful about the existence of psi. *Journal of Consciousness Studies* 10: 29–50.

Azar, B. 2011. A reason to believe. *Monitor on Psychology* 41(11): 52–56.

Field, T. 2008. *Complementary and Alternative Therapies Research*. Washington, DC: American Psychological Association Books.

Forer, B.R. 1949. The fallacy of personal validation: A classroom demonstration of gullibility. *Journal of Abnormal and Social Psychology* 44: 118–23.

Irwin, H.J., and C.A. Watt. 2007. *An Introduction to Parapsychology*. Jefferson, North Carolina: McFarland.

Krippner, S.C. 2002. Conflicting perspectives on shamans and shamanism: Points and counterpoints. *American Psycologist* 57: 962–77.

Krippner, S., and J. Achterberg. 2000. Anomalous healing experiences. In E. Cardena, S.J. Lynn, and S.C. Krippners, eds. *Varieties of Anomalous Experience: Examining the Scientific Evidence*. (Washington, DC: American Psychological Association), 353–95.

Leibovici, L. 2001. Effects of remote, retroactive intercessory prayer on outcomes in patients with bloodstream infection: Randomised controlled trial. *British Medical Journal* 323: 1450–51.

Randi, J. 1983a. The Project Alpha experiment: Part one: The first two years. Skeptical Inquirer 7(4) (Summer): 24–33. Reprinted in K. Frazier, ed. 1986. *Science Confronts the Paranormal*. Amherst, New York: Prometheus Books. Available online at www.banachek.org/nonflash/project_alpha.htm; accessed July 1, 2011.

———. 1983b. The Project Alpha experiment: Part two: Beyond the laboratory. *Skeptical Inquirer* 8(1) (Fall): 36–45. Available online at www.banachek.org/nonflash/project_alpha.htm; accessed July 1, 2011.

Roach, M. 2005. *Spook*. New York: Norton.

Smith, J.C. 2010. *Pseudoscience and Extraordinary Claims of the Paranormal: A Critical Thinker's Toolkit*. New York: Wiley-Blackwell.

———. 2011. The Flying Spaghetti Monster and the Pastafarian Quatrains. Skeptical Inquirer 35(5) (September/October): 54–56.

Sokal, A. 1996. Transgressing the boundaries: Towards a transformative hermeneutics of quantum gravity. *Social Text* 46/47: 217–52.

———. 2010. *Beyond the hoax: Science, Philosophy, and Culture*. New York: Oxford University Press.

Note

1. I get 176,000 Google hits for "Randi Project Alpha," compared to 175,000 hits for "bending spoons."

Jonathan C. Smith is a licensed clinical psychologist and professor of psychology at Roosevelt University in Chicago. He is the author of twenty books, including the highly acclaimed text *Pseudoscience and Extraordinary Claims of the Paranormal: A Critical Thinker's Toolkit*. Smith wrote "The Flying Spaghetti Monster and the Pastafarian Quatrains" in our September/October issue. He is also founder of the True Word (New Apocalyptic Reformed) Church of the Flying Spaghetti Monster. "May you be touched by His Noodly Appendage."

Civilizations Lost and Found: Fabricating History

Part Three: Real Messages in DNA

The *Lost Civilizations of North America* documentary suggests that there is genetic evidence for a pre-Columbian migration of Israelites to the Americas. However, DNA studies provide no support for this hypothesis.

DEBORAH A. BOLNICK, KENNETH L. FEDER, BRADLEY T. LEPPER, and TERRY A. BARNHART

"DNA science apparently settles the biological question of who these ancient, advanced Hopewell mound builders were. But where else is this DNA found? And where did it originate?"—The Lost Civilizations of North America

In Part One of our series on diffusionist perspectives espoused in the *Lost Civilizations of North America* documentary (SI, September/October 2011), we discussed allegations made in the documentary that the true history of ancient North America has been hidden, perhaps intentionally, by mainstream scientists and historians (Feder et al. 2011). In Part Two (November/December 2011), we addressed claims made by diffusionists in general and in the documentary in particular concerning the discovery of artifacts with written inscriptions presented in support of that alternative history (Lepper et al. 2011). Here, in Part 3, we will address the interpretation proffered by some of those interviewed in the documentary that DNA studies prove a direct biological and historical connection between the mound builders of the American Midwest and the ancient inhabitants of the Middle East.

Lost Civilizations: Genetic Evidence

DNA studies have helped to address important questions about the biological makeup of Hopewell mound builder populations and where their ancestors came from, but the genetic data do not provide any evidence for a direct link between the Hopewell and Israelite populations of the Middle East, as some interviewees in *Lost Civilizations* claim. To date, DNA has been extracted from the remains of seventy-three individuals buried at two sites exhibiting Hopewell archaeological features (the Pete Klunk mound group in Illinois and the Hopewell mound group in Ohio). Maternally inherited mitochondrial DNA (mtDNA) was analyzed, and it shows that the genetic makeup of these populations was broadly similar to other ancient and contemporary Native American populations from eastern North America (Mills 2003; Bolnick and Smith 2007) (Figure 1). When the Hopewell population (as well as other Native Americans) is compared with Old World populations, they are most genetically similar to populations in Asia. The scientific consensus, based on more than 150 studies of Native American genetic variation, suggests that all Native Americans are descended from a single source population that originated in Asia and migrated to the Americas via Beringia (Figure 2) approximately fourteen thousand to twenty thousand years ago (Kemp and Schurr 2010). This consensus reflects not only the observed patterns of mtDNA variation but also studies of paternally inherited *Y*-chromosome markers and biparentally inherited autosomal markers.

While the *Lost Civilizations* video does mention this "mainstream" perspective, it emphasizes a different interpretation of the Hopewell genetic data. Specifically, the video suggests that the presence of a mtDNA lineage known as "haplogroup *X*" in the Hopewell population is evidence of a pre-Columbian migration of Israelites to the Americas because haplogroup *X* originated in the "hills of Galilee" in Israel and began to disperse out of the Middle East approximately two thousand years ago. This argument is seriously flawed for four reasons.

First, while several genetic studies indicate that haplogroup *X* may have first evolved in the Near East (Brown et al. 1998; Reidla et al. 2003; Shlush et al. 2008), these studies do not suggest that it originated specifically in Israelite or other Hebrew-speaking populations. Haplogroup *X* is found throughout the Near East, western Eurasia, and north-

ern Africa, and it is not unique to (nor especially common in) Israelite or Jewish populations (Reidla et al. 2003; Behar et al. 2004). Shlush et al. (2008) did find a higher frequency of haplogroup *X* in the Galilee Druze, a (non-Jewish) population isolate that practices a distinctive monotheistic religion, but the authors themselves point out that their nonrandom sampling strategy does not provide an accurate estimate of population haplogroup frequencies. Furthermore, Shlush et al. (2008) argue that the Galilee Druze represent a contemporary "refugium" for haplogroup *X*, not that haplogroup *X* must have originated in the hills of Galilee (as diffusionist Donald Yates claims in the video).

Second, and more important, the forms of haplogroup *X* found in the Galilee Druze (and elsewhere in the Near East) are *not* closely related to the particular form of haplogroup *X* found in Native Americans. All members of haplogroup *X* share some mutations, reflecting descent from a common maternal ancestor, but other mutations divide haplogroup *X* mtDNAs into various subdivisions (subhaplogroups) that diverged after the time of the shared maternal ancestor (Reidla et al. 2003). The Hopewell and other Native American populations exhibit sub-haplogroup *X2a*, which is different from the subhaplogroups present in the Galilee Druze (subhaplogroups *X2**, *X2b*, *X2e*, *X2f*) or other Middle Eastern populations (Reidla et al. 2003; Shlush et al. 2008; Kemp and Schurr 2010). Because subhaplogroup *X2a* is not found in the Middle East and is not particularly closely related to the forms of haplogroup *X* that are found in that region, the haplogroup *X* data do not provide any evidence for a close biological rela-

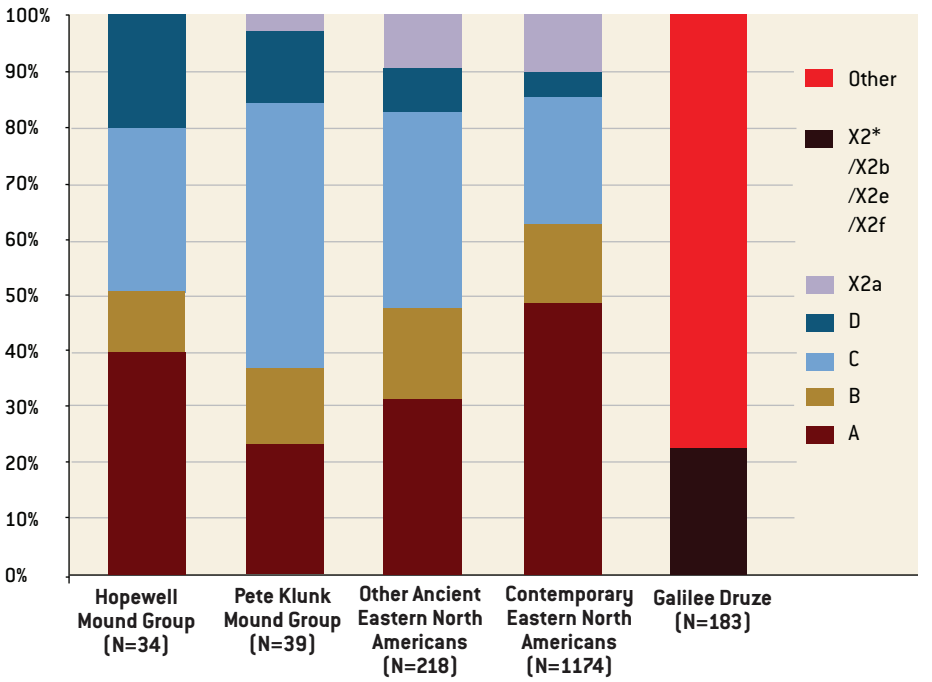


Figure 1. Mitochondrial DNA (mtDNA) haplogroup frequencies for Native American populations from eastern North America and the Galilee Druze. Note the level of consistency in the distribution of mitochondrial haplogroups among Native Americans. The distribution of haplogroups in a Galilee Druze population is quite different.

Figure 2. This map shows the configuration of the modern coastlines of northeast Asia and northwest North America, along with the maximum Late Pleistocene extent of the Bering Land Bridge. Its existence, between thirty-five thousand and eleven thousand years ago, provided a broad avenue across which human beings first entered the New World from the Old.

If there had been a pre-Columbian migration of Israelites to eastern North America, we would almost certainly see other common Middle Eastern lineages in the Hopewell and other Native American populations. We don't.

tionship between Hopewell and Middle Eastern populations or any support for a direct migration from the Middle East to the Americas in pre-Columbian times.

Third, it is misleading and inappropriate to focus exclusively on haplogroup *X* and to ignore all other mtDNA lineages when considering the genetic origins of the Hopewell mound builders—especially since haplogroup *X* was found in only one of the seventy-three Hopewell individuals studied. As noted earlier, when all mtDNA haplogroups present in the Hopewell population (as well as other Native Americans) are considered, the genetic evidence clearly indicates an Asian origin. Furthermore, if there had been a pre-Columbian migration of Israelites to eastern North America, we would almost certainly see other common Middle Eastern lineages in the Hopewell and other Native American populations. We don't. None of the thirteen other mtDNA haplogroups found in the Galilee Druze is present in the Hopewell or other pre-Columbian Native Americans (see Figure 1). Nor do we see any of the common Druze or Middle Eastern *Y*-chromosome haplogroups in indigenous Americans. The genetic data therefore provide no evidence whatsoever for a migration of Israelites to eastern North America.

Finally, DNA studies do not suggest that haplogroup *X* began to disperse out of the Middle East only about 2,000 years ago, as diffusionist Rod Meldrum claims in the *Lost Civilizations* video. Meldrum argues that there is a scientific controversy over the rate of mtDNA mutation, and he suggests that (a) the most accurate mutation rate estimates come from human pedigree studies and (b) those mutation rates demonstrate that haplogroup *X* began to diversify and spread approximately two thousand years ago. However, the particular controversy that Meldrum cites is a decade old, concerns the mutation rate in only one small segment of mtDNA (the control region), and has generally been resolved. Pedigree studies measure the rate of mutation ob-

served in parent-offspring comparisons, but many mutations are eliminated within a few generations of their occurrence because of natural selection, genetic drift, and recurrent mutation at some sites in the DNA. The measurable rate of mtDNA evolution therefore decreases over time (Soares et al. 2009), making it inappropriate to use mutation rate estimates from pedigree studies for dating the origin and diversification of most lineages (for example, any that originated more than a few generations ago). Instead, the mtDNA mutation rate is calculated by measuring the number of genetic differences between two or more individuals (or species) and then dividing that number by the length of time since they diverged from a common ancestor. The timing of their divergence is based on fossil, archaeological, and/or geological evidence, and it is not simply "theoretical" (as Meldrum suggests). Furthermore, Meldrum does not rely on newer findings to argue that haplogroup *X* began to diversify and spread only two thousand years ago, as he claims, but rather on an old and unusually fast estimate of the mtDNA mutation rate (Parsons et al. 1997). Virtually all pedigree studies have found significantly lower mutation rates (Howell et al. 2003) than the one Meldrum uses, which suggests that haplogroup *X* began diversifying much earlier than he claims. Studies of the complete mitochondrial genome (rather than just the control region), using less controversial mutation rates for the mtDNA coding region, also suggest that haplogroup *X* began to diversify much earlier (~31,800 years ago; Soares et al. 2009).

Conclusion

In the past, many scholars have pointed to a sometimes explicitly racist agenda behind the claims of diffusionists who argue that the glories of Native American civilizations were achieved only through borrowing from various Old World groups. The producers of the *Lost Civilizations of North America* and the diffusionists they feature in their documentary turn this argument on its head by suggesting that it is instead those "mainstream" scholars who are the real racists because they deny Native Americans their role in an already globalized world of the early centuries of the Common Era. However, the only support for this picture of Native American–Old World interactions two thousand years ago comes from resurrected frauds and distorted history. There is no credible archaeological or genetic evidence to suggest that any Old World peoples migrated to the Americas after the initial incursion from Siberia prior to the tentative forays of the Norse beginning at around 1000 CE other than limited contacts between Siberia and the American arctic.

References

Behar, Doron M., Michael F. Hammer, Daniel Garrigan, et al. 2004. MtDNA evidence for a genetic bottleneck in the early history of the Ashkenazi Jewish population. *European Journal of Human Genetics* 12: 355–64.

Bolnick, Deborah A., and David G. Smith. 2007. Migration and social structure among the Hopewell: Evidence from ancient DNA. *American Antiquity* 72: 627–44.

Brown, Michael D., Seyed H. Hosseini, Antonio Torroni, et al. 1998. MtDNA haplogroup X: an ancient link between Europe/Western Asia and North America? *American Journal of Human Genetics* 63:1852–61.

Feder, Kenneth, Bradley T. Lepper, Terry A. Barnhart, and Deborah A. Bolnick. 2011. Civilizations lost and found: Fabricating history, part one: An alternate reality. Skeptical Inquirer 35(5) (September/October): 38–45.

Howell, Neil, Christy Bogolin Smejkal, D.A. Mackey, et al. 2003. The pedigree rate of sequence divergence in the human mitochondrial genome: There is a difference between phylogenetic and pedigree rates. *American Journal of Human Genetics* 72: 659–70.

Kemp, Brian M., and Theodore G. Schurr. 2010. Ancient and modern genetic variation in the Americas. In *Human Variation in the Americas*. Benjamin M. Auerbach, editor. Center for Archaeological Investigations, Occasional Paper No. 38: 12–50.

Lepper, Bradley T., Kenneth L. Feder, Terry A. Barnhart, and Deborah A. Bolnick. 2011. Civilizations lost and found: Fabricating history, part two: False messages in stone. Skeptical Inquirer 35(6) (November/December): 48–54.

Mills, Lisa. 2003. Mitochondrial DNA analysis of the Ohio Hopewell of the Hopewell Mound group. Unpublished PhD dissertation, Department of Anthropology, The Ohio State University, Columbus, Ohio.

Parsons, Thomas J., David S. Muniec, Kevin Sullivan, et al. 1997. A high observed substitution rate in the human mitochondrial DNA control region. *Nature Genetics* 15: 363–68.

Reidla, Maere, Toomas Kivisild, Ene Metspalu, et al. 2003. Origin and diffusion of mtDNA haplogroup X. *American Journal of Human Genetics* 73: 1178–90.

Shlush, Liran I., Doron M. Behar, Guennady Yudkovsky, et al. 2008. The Druze: A population genetic refugium of the Near East. *PLoS ONE* 3(5): e2105.

Soares, Pedro, Luca Ermini, Noel Thomson, et al. 2009. Correcting for purifying selection: An improved human mitochondrial molecular clock. *American Journal of Human Genetics* 84: 740–59.

Deborah A. Bolnick is assistant professor of anthropology at the University of Texas at Austin.

Kenneth L. Feder is professor of anthropology at Central Connecticut State University. He is a fellow of the Committee for Skeptical Inquiry.

Bradley T. Lepper is the curator of archaeology for the Ohio Historical Society in Columbus, Ohio.

Terry A. Barnhart is professor of history at Eastern Illinois University in Charleston, Illinois.

Disclaimer

We are well aware that a claim underlying the *Lost Civilizations* documentary—that the mound-building people of the American Midwest were migrants from the Middle East 2,000 years ago—may be informed by religious doctrine. It is our position in this paper, however, that whatever inspires this claim is not nearly as important as the fact that it is plainly wrong. As such, we will leave it to others to assess the role played, if any, by religion in shaping *Lost Civilizations* and focus instead on scientific evidence relevant to that claim.

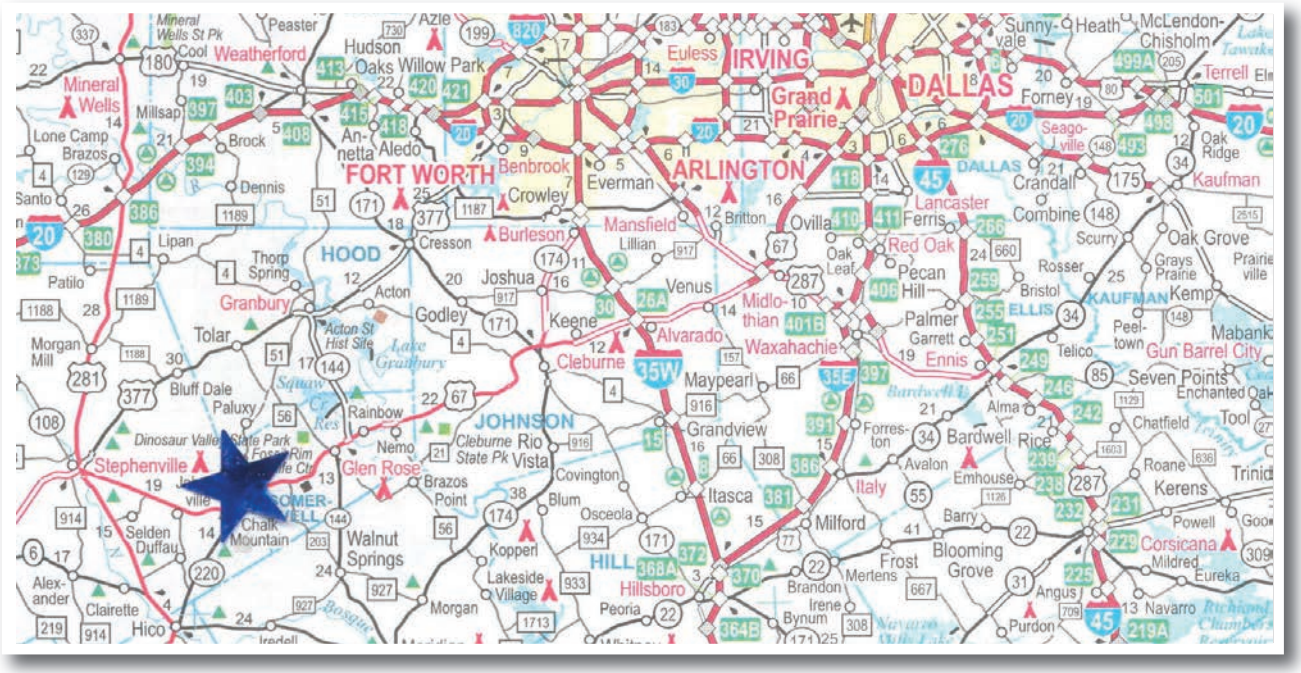
The Mysterious Meteorite of Chalk Mountain, Texas

In May 2009 a meteorite impact was reported just thirty miles south of Fort Worth, Texas, but the mysterious object was of a very unusual composition for a meteorite. Had an impact occurred, it would have caused widespread devastation—yet nothing of the sort happened.

MANFRED CUNTZ

From my perspective, the event started to unfold at 8:20 AM CDT on May 18, 2009, when I received a phone call from Sue Stevens, the senior media relations officer at the University of Texas at Arlington (UTA). I'm an associate professor of physics and currently director of the astronomy program at the same institution. Arlington, well known as a sports and university city, is located in the center of the Dallas–Fort Worth metroplex. Stevens told me that she received an urgent phone call from Richard Ray, a reporter from a Fox TV affiliate, about a truly extraordinary event: a meteorite impact that occurred overnight, just south of Fort Worth. Richard Ray wanted to give me a call within the next few minutes, and he wanted to meet me at the impact site later that day.

Of course, I agreed. The reporter explained to me that the meteoric impact occurred close to Texas State Highway 67 at a location thirty miles south of Fort Worth, very close to the county line between the Erath and Somervell counties in the proximity of Chalk Mountain. In fact, this place is located at the northern outskirts of the Texas Hill Country, a geographical region of Central Texas four times the size of Connecticut. The Texas Hill Country is known for its vast diversity in botany and wildlife. Geological features include limestone and granite. It is noteworthy that the greater area of the alleged meteoric impact site is known for mysteries such as UFO sightings near Stephenville (January 8, 2008) and the



Overall setting of the meteoric site. Credit: Steve Hudgeons, Texas Mutual UFO Network (MUFON) lead investigator; forwarded by Richard Ray, Fox TV.

"Creation Evidence Museum" in Glen Rose. Some of the UFO sightings have meanwhile been attributed to night flights and flares dropped by US Air Force F-16s stationed at Fort Worth (see "The Stephenville Lights: What Actually Happened," SKEPTICAL INQUIRER, January/February 2009).

Visiting the Impact Site

Due to my work schedule, I decided to meet the television reporter at noon at the site of the alleged meteorite impact. I was accompanied by Aurelian Balan, the astronomy laboratory supervisor at UTA. At the site of impact, we met Corky Underwood, who owned the property. We also met Arthur J. Ehlmann, emeritus professor of geology at Texas Christian University (TCU), a leading expert in meteoric research, as well as the current curator of TCU's Oscar E. Monning Meteorite Gallery. There were a few other spectators as well.

The site of impact was quite amazing. The supposed meteorite was nearly round in shape and as big as a standard refrigerator. It was of a grayish-white color and did not show any signs of heat-related coating or disintegration. It was sitting near the end of a trench, and as a secondary feature it was sitting on a crater about three times the diameter of the meteorite. The trench itself seemed to indicate that the meteorite was partially sliding on the ground before coming to a complete stop. Corky Underwood also pointed to some trees in the background that had apparently been damaged by the incoming "meteorite." "These trees were perfectly all right before the meteorite hit," he said. The tracks on the ground as well as the smashed trees pointed to an extremely inclined meteoric trajectory.

My colleague Arthur Ehlmann chipped off a piece of the meteorite with his pocket knife. "This is limestone," he explained. "This can't be from outer space." Limestone is a sedimentary rock, one of the three major rock groups that form Earth's crust. It is composed mostly of calcium and magnesium carbonates and is formed via deposition in water. Limestone isn't found in meteorites.

Meteorite Origins

Meteorites are natural objects originating in outer space that survive impact with Earth's surface. Most meteorites derive from small astronomical objects called meteoroids, but they are also sometimes produced by impacts of asteroids, the large counterparts of meteoroids. When they enter the atmosphere, impact pressure causes the body to heat up and emit light. Meteorites have traditionally been divided into three broad categories: stony meteorites are rocks, mainly composed of silicate minerals; iron meteorites are largely composed of metallic iron-nickel; and stony-iron meteorites contain large amounts of both metallic and rocky material. Stony meteorites are by far the most abundant. Modern classification schemes divide meteorites into groups according to their structure, chemical

Arthur Ehlmann chipped off a piece of the meteorite with his pocket knife. "This is limestone," he explained. "This can't be from outer space." Limestone is a sedimentary rock, one of the three major rock groups that form Earth's crust.

Meteorite and crater. Credit: Steve Hudgeons, Texas Mutual UFO Network (MUFON) lead investigator; forwarded by Richard Ray, Fox TV

A piece of earth-moving equipment available from "RECS—Rental Equipment Contractor Supplies." The company's website identifies Elaine Underwood as owner and Corky Underwood as sales/operation manager.

and isotopic composition, and mineralogy.

Most meteoroids disintegrate significantly when entering Earth's atmosphere. If they hit the ground, the objects are known to arrive at their terminal velocity and typically create craters about ten times their size. Explosions, detonations, and rumblings are often heard during meteorite falls, which can be caused by sonic booms as well as shock waves resulting from major fragmentation events. These sounds can be heard over wide areas, up to many thousands of square miles. As meteoroids are heated during atmospheric entry, their surfaces melt and experience ablation. They can be sculpted into various shapes during this process. Obviously, all these features are in stark contrast to those of the meteorite encountered at Chalk Mountain.

The Meteorite in the News

The Chalk Mountain meteorite received significant news coverage, including from Fox TV. Although the Fox TV clip, which aired on the evening of May 18, 2009, was clearly skewed toward sensationalism, it was still technically correct because it stated that the so-called meteorite finding poses an unsolved mystery because its origin is still unknown. I also gave an interview to Whitney White-Ashley from a small local newspaper located at Glen Rose, the seat of Somervell County. Angelia Joiner later published an online article about the meteorite that tried to create the impression that there is chemical evidence that the rock is not from the immediate area. Joiner also quoted Steve Hudgeons, lead investigator of the Texas Mutual UFO network, who offered a calculation about the trajectory of the rock. At that time, the true origin of the meteorite was a mystery.

Conclusion

I received an unexpected and intriguing clue via email on May 20, 2009, from John Maroul of Benbrook, Texas, who had previously forwarded me a list of science questions about meteorites. His email read in part: "Look what Corky Underwood does for a living: Rents and sells heavy equipment that can carve limestone and dig trenches. Not saying he hoaxed this but it is more than suspect."

The solution to the meteorite mystery at Chalk Mountain turned out to be both trivial and embarrassing. John Maroul's email also pointed me to the website www.recsinc.com, which contains detailed information on renting out earth-moving equipment. According to the website, the company's equipment is able to handle dirt and all sizes of rock. Together with the overwhelming scientific evidence that the "meteorite" could not be from outer space due to its limestone composition and, additionally, would not have survived its path through Earth's atmosphere, this was the final piece of the puzzle. Problem solved—it was almost certainly a hoax.

For those of you who would like to find and visit the alleged site of the "meteorite impact," please be aware: the site is located on private property (indicated by a clearly visible sign), and most Texans, especially those in the Hill Country, own guns. There may be an admission fee. ■

Note

I later called the Fox News reporter to tell him my conclusion and the evidence on which it was based. Shortly after our phone conversation, the Fox News clip (which was about two minutes long) became unavailable.

References

Bennett, Jeffrey, and Seth Shostak. 2007. *Life in the Universe*, 2nd ed. Boston, Massachusetts: Addison-Wesley.

Comins, Neil F., and William J. Kaufmann III. 2008. *Discovering the Universe*, 8th ed. New York: W.H. Freeman and Co.

Creation Evidence Museum Online. Available online at http://www.creationevidence.org; accessed January 1, 2011.

Ehlmann, Arthur J. 2008. *The Oscar E. Monning Meteorite Collection Catalog*. Tucson, Arizona: Stanegate Press.

Joiner, Angelina. Mysterious crater and rock baffles all. Available online at http://www.angeliajoiner.com; accessed March 29, 2010.

"RECS—Rental Equipment Contractor Supplies." Accessed April 7, 2010; January 5, 2011. Available online at www.recsinc.com.

Seeds, Michael A. 2006. *Horizons: Exploring the Universe*. 9th ed. Belmont, California: Thomson Brooks/Cole.

Manfred Cuntz is an associate professor of physics and director of the astronomy program at the University of Texas at Arlington

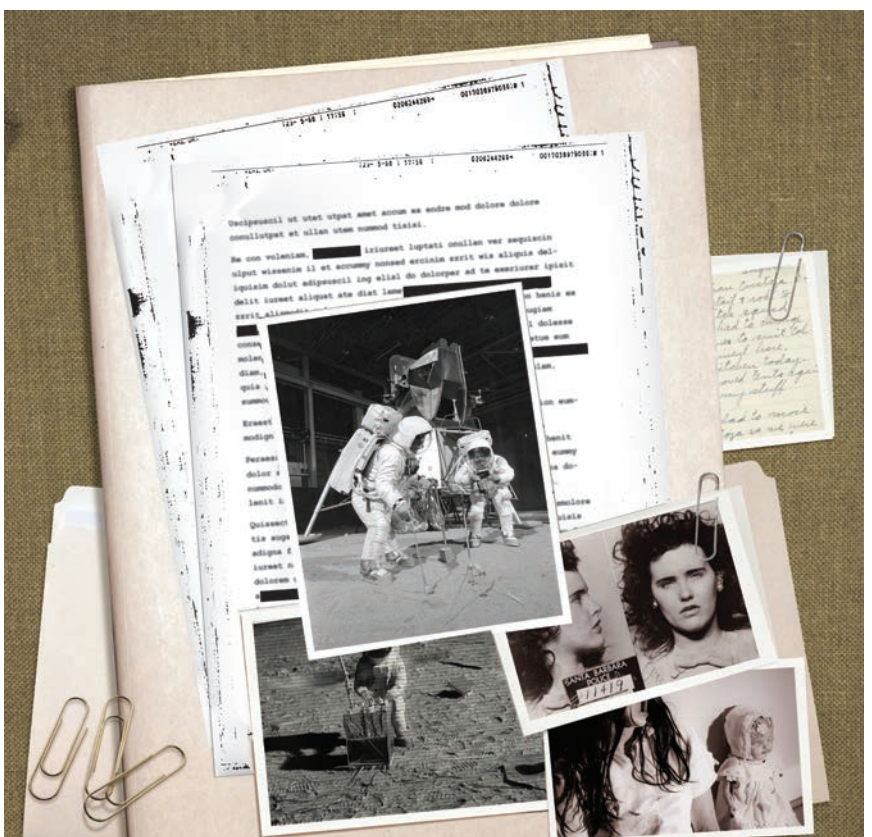
Information Literacy and Conspiracy Theories

Archives, 'Lost' Records, and Found Rubbish

The public often believes that missing records indicate that important information has been suppressed by prevailing authorities. An archivist explains the nature of conspiracy theories, including record loss, and cautions against accepting "objective" claims even by original sources.

KRISTIN E. HARLEY

Conspiracy theories abound regarding "lost" or secret records. Examples include the disappearance of physical evidence in the "Black Dahlia" murder case at the Los Angeles Police Department (Leung 2004), the missing slow-scan television analog videotapes of Neil Armstrong's moon walk (Kaufman 2007), and the alleged diary of a priest involved in incidents depicted in the film *The Exorcist* (Opsasnick 1973). What would otherwise be a mishap or mere rumor gets blown up in people's minds as another example of the "powers that be" suppressing explosive revelations. If only we had these "censored" records, the truth would come out! It would destroy the Darwinist/atheist/materialist hegemony! We have heard these canards far too often.



Many authorities suppress records for various reasons. However, conspiracy theories about missing records are built on the assumption that the complete and unambiguous truth exists in some source. These records are not mere evidence or witnesses to truth; they *are* the truth. Yet the nature of knowledge is fragmentary, decentralized, and is never revealed wholesale in any sacred tome. Records are biased, and facts get muddled by conflicting witness statements or by bureaucratic quibbling. Truth is found more in statistics than in simple absolutes. This is why we need scientists, detectives, historians, librarians, investigative journalists, activists, and archivists—not only to discover facts but to *connect* these disparate pieces of information so that the facts can be properly understood. Without connections, the world of knowledge would resemble the library of Jorge Luis Borges's famous short story: filled with books that cannot be located without a classification system. When one works with records, it becomes apparent how easily they can become disorganized or even lost without any evil intent.

Even—or especially—in this age of Google, nothing replaces sound research techniques for connecting the facts. The tiresome cliché of the "dusty archives" points to an even more insidious image: the supposedly untouched oeuvre or the hidden manuscript that, once found, reveals everything. Presumably all one must do is find it, blow off the dust, and read it to achieve wisdom.

If only gaining knowledge were that simple; if only teasing out the truth could be a matter solely of possession.

For all our technical sophistication, most people are still woefully information illiterate and, misguided by cable news, the Internet, or Hollywood, have unreasonable expectations that make them resist the tedious work of open-ended inquiry. This fuels popular conspiracy theories and a hankering for revelation. College and university librarians, charged with teaching information literacy to students, are on the front lines of a battle that must be joined by faculty, archivists, scientists, writers, curators, activists, and journalists if the public at large is to break free of the stranglehold that pseudoscience has on it.

In my work as an archivist, I have had to sort through files labeled "miscellaneous" or "filing" or even "?" and reconstruct an arrangement that the documents may have never actually had—or that may have existed only *conceptually* while these papers were being actively used. This is no small task; a guiding principle of archival science is *original order*: the retention of associated documents in their logical organization during their active "life." In this, an archivist's job is not unlike that performed by the brain as it remembers—both are reconstructive, involving the reordering and the discarding of disparate data. The aim is not to reconstruct this association "objectively" but to retain or restore the particular style of a creator—the person or organization that originated the records. If a creator of a collection is organized, the archivist can focus on cataloging and preserving the work and does not have to piece together projects, chase down correspondence, decipher drafts, or evaluate handwritten notes. However, few creators are this accommodating, and it is not unheard of for an archivist to receive boxes of papers haphazardly dumped into them without any order at all.

For this and other mundane reasons, records are "lost" all the time, while other records languish, properly cataloged but unread, their significance missed. Think of Gregor Mendel's work on heredity and what it could have meant to Darwin. Yet it was no conspiracy. Such historical

The tiresome cliché of the "dusty archives" points to an even more insidious image: the supposedly untouched oeuvre or the hidden manuscript that, once found, reveals everything. Presumably all one must do is find it, blow off the dust, and read it to achieve wisdom.

near-misses appear to be the rule rather than the exception. I have never worked anywhere in which crucial documents have not on occasion been misplaced, taken home, ignored, or mistakenly destroyed.

More important, many collections were never complete in the first place. For example, if a scholar dies, Harvard might get his dissertation, his home state's archives might get his letters, and his family might have his unfinished manuscripts. At no time were this person's papers all under one roof. After the death of the French writer Antonin Artaud, his relatives, friends, and doctor publicly accused each other of stealing his effects. Even the most meticulous cataloging system can allow a film to slip through the cracks, as apparently happened to the moon walk video during shipment (a particularly vulnerable time for any records system). Yet despite the fact that many other videos of the real-time broadcast were made on July 21, 1969, the "lost Apollo 11 tapes" still fuels speculation that the moon landing never happened.

Yes, Virginia, police department evidence boxes routinely get lost, too—particularly when a cold case is over fifty years old. It does not matter how famous that case—such as the "Black Dahlia" murder—still is.

In the early hours of January 15, 1947, the naked, bloodless, and expertly bisected body of twenty-two-year-old Elizabeth Short, referred to as the Black Dahlia, was dumped in a Los Angeles vacant lot. The criminal investigation became a national sensation, spawning myths that circulate to this day. A flurry of books has been published about the murder, including the engrossing but silly *Black Dahlia Avenger* by Steve Hodel, the son of the late George Hodel, who believes his father was the Black Dahlia murderer despite the fact that the elder Hodel had been exonerated of the crime. Here the case takes one of its many twists, for Steve Hodel claims that the box containing the LAPD's evidence against his father has gone missing.

Steve Hodel's unsupported speculations about his father's involvement with Elizabeth Short's murder are just that: unsupported speculations that are bolstered only by the younger Hodel's obsession with photographs from his father's album that do not even resemble Short. Certainly, the loss of the evidence box does nothing to dissuade Hodel from his cause, but this loss actually presents an obstacle to any resolution of the case—not evidence of any cover-up. Since the Hodel-as-the-Black-Dahlia-murderer hypothesis is at best unconvincing, it would seem that for some reason the younger Hodel merely *wishes* his father was guilty.

Yes, Virginia, police department evidence boxes routinely get lost, too—particularly when a cold case is over fifty years old. It does not matter how famous that case—such as the "Black Dahlia" murder—still is.

People wish all sorts of things. No fewer than fifty men claimed to be the Black Dahlia murderer (Gilmore 1998), and the elder Hodel hinted at it himself. Despite evidence that points away from George Hodel's guilt, including transcripts from the bugs planted in the doctor's house, his son Steve persists in finding "evidence" for his assumed conclusion. "I don't have to be convinced. I don't need an expert to tell me. I know [George Hodel's guilt] as a fact," he says. What convinces the younger Hodel? "Because it's the truth" (Leung 2004). This lack of critical thinking is astonishing. Locating Hodel's evidence box could make no difference when self-styled investigators brandish archives like swords over Dahlia turf in lieu of examining their facts *in context*.

The point is, human records follow a trajectory all their own. In certain circumstances, written records can be as problematic as oral testimony, and thus we should be suspicious of any polished source offering "revealed truth" and claiming a historic origin. It just is not very likely that this is anything other than a modern fake.

Which brings us to that alleged diary of the priest who inspired *The Exorcist*. William Peter Blatty, who wrote the novel and the screenplay, claims that the exorcizing priest kept a diary about the proceedings. This purported diary is held up by religious believers in exorcism, particularly Catholics, as "proof" that *The Exorcist* was based on a real account of demonic possession. The victim, a Cottage City, Maryland, teenager (not living in Mount Rainier as is popularly reported) was indeed troubled. Various carbon copies of the diary with differing numbers of pages have been circulating for years; however, the journalist Mark Opsasnick uncovered this unfortunate boy's real story by following up on the boy's birth date as reported in the diary. (This is a simple piece of evidence that should not have been neglected by any serious researcher, but before Opsasnick there had been no real research done.) The diary itself is unreliable as a source; the "possession" account is largely a rumor spread by word of mouth and repeated by credulous newspaper reporters, and the true story reveals a disruptive, but hardly supernaturally endowed, boy (Opsasnick 1973).

A different demon invades the otherwise enjoyable novel *Possession* by A.S. Byatt (1990). It almost ruined the book for me when two literary researchers discover, *in the same room*, correspondence between two nineteenth-

century poets who were supposed to have no relationship. Both complete sets of letters were hidden together, providing an unbiased window upon a concealed past. This is completely unrealistically convenient. All these literary researchers had to do was open the letters in sequence and learn the truth—nothing resembling even the relatively simple digging up of a letter from Rudyard Kipling as I did from a stack of "technical matters." Small wonder that the general public is surprised that librarians and archivists must earn a master's degree to enter their profession, when we are thus caricatured as overpaid filing clerks. (As Jon Stewart once joked, "Filing alpha-numerically? Slow down—I don't have a doctorate!" [Comedy Central 2009].)

Possession is a novel, but it perfectly illustrates two aspects of the problem here. First is the misconception that any source can possess "the answer" in the same manner that a crossword puzzle contains its solution. Second is the popular belief that prevailing authorities are driven to possess this subversive truth before the public learns of it. Research and scientific inquiry are thus reduced in the popular mind to a mere MacGuffin plot device. Will the heroes (priests, scruffy English nerds, intelligent design advocates, Tea Partiers, Birthers, 9/11 Truthers) rescue this holy grail before the evildoers (atheists, moneyed curators, Darwinists, liberals, the Obama Youth, scientists) get their paws on it? The similarities here to the persecuted Christians in their catacombs, or to Jews and Muslims under pagan rule, are obvious. It also has a parallel in the popular conception of science as a collection of "proofs" or absolutes, rather than an often bewildering array of conditional probabilities, hypotheses, theories, and uncertainties.

Therefore, it is not surprising that the naive and the credulous can become, well, possessed by conspiracy theories. The niggling and less sensational task of ferreting out obstinate facts is too boring, time consuming, and suspiciously bureaucratic to those who want an unqualified truth that exists "out there somewhere," complete and uncorrupted and waiting to liberate the masses. It is so much more comforting for some people to believe that poets write perfectly honest letters to each other and keep them safe for posterity; priests record events faithfully without a personal agenda; the police must hide the Black Dahlia evidence because of a cover-up; or the imperialist United States never landed on the moon.

Yet the fact remains that in an increasingly interactive online world, it makes no sense for the average person to remain passive and uncritical, merely accepting everything that any book, cable news show, or website tells them. The mere fact of there being a "data deluge" requires people to filter information; why not learn to filter it intelligently? If one is cynical enough to indulge in conspiracy theories, one should also be sufficiently distrusting of sources to evaluate them instead of treating them as holy writ.

The ability to locate and evaluate authoritative information, ascertain the credibility of sources, recognize "too good to be true" offers, ask for and follow up on citations, demand explanation of internal inconsistencies, and begin to recognize one's own possible biases *is* information literacy. The more that the public recognizes that it must take an *active* role in vetting the bombardment from our increasingly interactive, multimedia world, the less the public will remain passive consumers of a dose of fact washed down with a gallon of fraud. In so doing, it will no longer flatter "the powers that be" by giving them the power to withhold a "truth" that no person or organization can ever possess. We must all work to empower the public to be more information literate, for then the "truth" becomes a matter not of possession but of lifelong seeking. ■

Acknowledgment

The author gratefully acknowledges the Smithsonian Institution in Washington, DC, for its contribution to this article.

Note

Exceptions do occur: Teri Horton's discovery of a probable Jackson Pollock painting at a thrift shop has been bolstered through fingerprint and chemical analysis. However, it is astonishing to see the attitude of an art curator like Thomas Hoving, the former director of the Metropolitan Museum of Art in New York City. Despite the art world being rife with forgeries, Hoving established provenance for the painting with his own supposed extra-human intuition (he said "The painting does not sing") above scientific inquiry (Moses 2006).

References

Byatt, A.S. 1990. *Possession*. New York: Vintage Books.

Comedy Central. 2009. Want ads—Grateful Dead archivist (video clip). *The Daily Show with Jon Stewart* (November 11). Available online at www.thedailyshow.com/watch/wed-november-11-2009/want-ads-grateful-dead-archivist.

Gilmore, John. 1998. *Severed: the True Story of the Black Dahlia Murder*. Los Angeles: Amok Books.

Kaufman, Marc. 2007. The saga of the lost space tapes. *Washington Post* (January 31). Available online at www.washingtonpost.com/wp-dyn/content/article/2007/01/30/AR2007013002065.html.

Leung, Rebecca. 2004. *Black Dahlia Confidential: A 48 Hours Mystery*. Aired November 27. Transcript available at www.cbsnews.com/stories/2004/11/23/48hours/main657318_page3.shtml?tag=contentMain;contentBody.

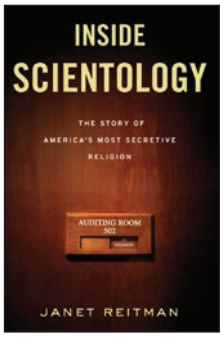
Moses, Harry. 2006. *Who the #$&% Is Jackson Pollock?* Distributed by Hewitt Group and New Line Cinema. Released November 9.

Opsasnick, Mark. The haunted boy of Cottage City: The cold hard facts behind the story that inspired 'The Exorcist.' *Strange Magazine* (20). Available online at www.strangemag.com/exorcistpage1.html.

Kristin E. Harley, a longtime reader of the SKEPTICAL INQUIRER, is a freelance writer, former local science columnist, and an APEX/ELM Specialist at Hennepin County Library. She finished her master's degree in library and information science from St. Catherine University in 2010 and volunteers at the Minnesota Air National Guard Museum. She can be reached at kohoutek1976@gmail.com.

Scientology under the Looking Glass

WENDY M. GROSSMAN



Inside Scientology: The Story of America's Most Secretive Religion
By Janet Reitman. Houghton Mifflin Harcourt, Boston, 2011. ISBN: 978-01-618-88302-8. 444 pp. Hardcover, $28.

Writing about the Church of Scientology (CoS) requires bravery. The author of the first journalistic book about the organization, Paulette Cooper, nearly went to jail on a framed drugs charge after her book was published in 1971. Richard Behar's 1991 article, "The Cult of Greed," cost *Time* magazine seven years and $10 million to defend. While researching that story, Behar noted in a sidebar, at least ten attorneys and six private detectives were assigned to "threaten, harass, and discredit" him.

Nothing so dramatic happened when I covered for *Wired* the Church of Scientology's 1993–1995 efforts to contain criticism on the Internet; the creepiest moment was getting an email message demanding details of what I wanted from a top Scientology PR agent less than twenty-four hours after requesting an interview with someone I'd found online who appeared to be entirely independent. As long as I avoided peeking up the financial skirts of the CoS, I was advised at the time by an experienced former Scientologist, I should be all right. I did, and I was.

All of that is likely why, as Reitman says, there have been no independent journalistic books about Scientology in the past twenty-five years. Between 1987, when British journalist Russell Miller tackled the biography of founder L. Ron Hubbard, and 2005, when Reitman began researching the 2006 *Rolling Stone* article that formed the basis of this book, the field was left to Scientologists past and present. Members tend to write propaganda; those who've left tend to write out of pain, anger, and betrayal. Reitman aims to be neutral, but it's fair to say that her account of the CoS and its works has more in common with those of Scientology's critics. It is unsurprising to learn, therefore, that the CoS has issued a seven-page complaint about the book, calling it poorly researched, inaccurate, and devoid of input from insiders.

In an interview with Slate (www.slate.com/id/2298771/), Reitman has responded that she spent three days with the CoS's current spokesman, Tommy David, and visited its international base and one of its schools. The book is full of quotes from what were clearly lengthy interviews with many Scientologists—most were disaffected, but some were still members when the interviews took place. I would not call it underresearched.

Approximately the first third of the book reviews material that will be largely familiar to any who have read earlier Hubbard biographies such as Bent Corydon's *Messiah or Madman?* (Lyle Stuart, 1987) or Russell Miller's *Bare-Faced Messiah* (Michael Joseph, 1987). Reitman reviews Hubbard's early life, the contradictory accounts of his military career, his work as a pulp fiction writer, and his marriages, as well as the origins of Dianetics, Scientology, and Hubbard's personal vendetta against psychiatry. Famous beginning in the 1950s, Scientology found traction among the exploring 1960s generation. For some people, it worked or seemed to; for others, it brought psychotic breakdown.

Less familiar material starts with the coup that saw David Miscavige, a Scientologist from the age of eleven, take control of an increasingly paranoid organization. From there, Reitman moves on to the building of Scientology's base in Clearwater, Florida, and in great detail describes the notorious case of Lisa McPherson, who died in a CoS-owned hotel after undergoing a mental breakdown and a cleansing procedure that was supposed to cure it. After that,

As long as I avoided peeking up the financial skirts of the Church of Scientology, I was advised at the time by an experienced former Scientologist, I should be all right. I did, and I was.

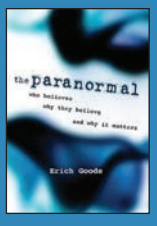
[NEW AND NOTABLE

Listing does not preclude future review.

50 POPULAR BELIEFS THAT PEOPLE THINK ARE TRUE. Guy P. Harrison.Partly highly readable debunking, partly a presentation of the real scientific stories behind popular beliefs in eight categories: magical thinking, aliens and astrology, science and reason, strange healings, lure of the gods, unusual beings, weird places, and doomsday warnings. Prometheus Books, 2011, 447 pp., $18.

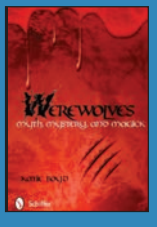
HEAVEN ON EARTH: The Varieties of Millennial Experience. Richard Landes. A thorough and insightful survey of apocalyptic movements, including examples from secular and political movements over the centuries. Oxford University Press, 2011, 499 pp., $35.

IS THERE ANYTHING GOOD ABOUT MEN? How Cultures Flourish by Exploiting Men. Roy Baumeister. Written by a professor of psychology at Florida State University, this book challenges many assumptions about male privilege and dominance in American culture, pointing out that in many ways men are considered more disposable than women. Oxford University Press, 2010, 303 pp., $24.95.



THE PARANORMAL: Who Believes, Why They Believe, and Why It Matters. Erich Goode. Not a debunking or claims-investigating book but a sociologist's well-informed attempt to explain paranormal belief as a sociological phenomenon—who believes, why, and what are the consequences? Prometheus Books, 2011, 323 pp., $19.

A THOUSAND DARKNESSES: Lies and Truth in Holocaust Fiction. Ruth Franklin. A fascinating discussion about the sensitive intersection of fiction and truth in Holocaust writings and memoirs; faked stories have given ammunition to Holocaust deniers, yet providing the absolute truth about such an event may be impossible. Oxford University Press, 2010, 272 pp., $29.95.



WEREWOLVES: Myth, Mystery, and Magick. Katie Boyd. An interesting, if not very skeptical, hodgepodge of werewolf lore and legend, including brief discussions of rabies, werewolf films and television shows, and were-beasts from around the world. Schiffer Publishing, 2011, 160 pp., $16.99.

—Benjamin Radford and Kendrick Frazier

Reitman covers Scientology's outreach to celebrities and examines the lives of those who have grown up in Scientology. Finally, she reviews the CoS's long-running battle with the IRS and takes a brief look at its finances, which she argues now rely on returns on its extensive real estate more than the auditing fees for which it is famous. Membership, she concludes, is shrinking despite its claims to the contrary.

People in Los Angeles will readily tell you that Scientology offers young actors training and career help in return for promotion later on. Hubbard originated this idea, but it was Miscavige who put it into practice by building the Celebrity Centre. There, stars like Tom Cruise and John Travolta see a much more indulgent version of Scientology. Staff and insiders live strictly controlled lives, working up to eighteen-hour days for little or no pay, and they may be punished for infractions by the withholding of food or sleep. The celebrity strategy has its drawbacks, as Miscavige learned in 2005 when Tom Cruise freaked out publicly on Oprah's sofa.

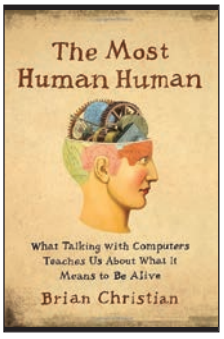
Reitman's most interesting sections are those in which she follows the adolescent struggles of teens raised inside Scientology. Some rebel and are punished; others fall in love and grapple with the conflict between their personal desires and the demands of their Scientology careers; a few regroup and thrive. Reitman is particularly impressed by their poise, and she notes that in the organization's schools Hubbard implemented teaching techniques that are now commonplace. For these kids, the Internet has been a game-changer: it is no longer possible to keep them away from all outside views.

With all this material to draw on, it's not surprising that Reitman devotes only a paragraph or so to Scientology's battle to keep its upper-level documents off the Internet. Former insiders say that Hubbard was very quick to catch on to the usefulness and importance of computers and that the CoS was a pioneer in its use of computer systems. As comprehensive as Reitman's book is, somewhere therein lies another tale for the next brave writer. ■

Wendy M. Grossman is founder and (two-time) former editor of the United Kingdom's *The Skeptic* magazine and a freelance writer.

Turing Test for Human Beings

MASSIMO PIGLIUCCI



The Most Human Human: What Talking with Computers Teaches Us about What It Means to Be Alive. By Brian Christian. Doubleday, New York, 2011. ISBN: 0385533063. 320 pp. Hardcover, $27.95.

Mathematician Alan Turing is famous for a number of things, but the one that comes most easily to mind is probably the Turing test, a simple procedure for allegedly determining whether a computer is thinking like a human being—or at least whether a computer can effectively fool us into coming to such a conclusion. Turing predicted that by the year 2000 computers would be able to trick human judges into thinking they were talking to a fellow human instead of a machine at least 30 percent of the time for conversations lasting about five minutes. This has always seemed to me to set the bar so low as to make the entire enterprise spectacularly uninteresting.

Sure enough, reading Brian Christian's *The Most Human Human* confirmed my impression that the so-called Turing test is one of the most hyped ideas in both artificial intelligence and philosophy of mind. Christian's book is well worth the read, particularly because he has a background and writing experience that allow him to write for the public about both science and philosophy or, as in this case, about the intersection between the two. The title of the book comes from something that happens during the yearly competition for what is known as the Loebner Prize. Hugh Loebner is an American inventor who in 1990 established a cash prize of $100,000 for the computer program that can do what Turing predicted computer programs ought to be able to do by now.

Reading Brian Christian's *The Most Human Human* confirmed my impression that the so-called Turing test is one of the most hyped ideas in both artificial intelligence and philosophy of mind.

No program has won the Loebner Prize so far but Christian participated in a side competition in 2009 for the "most human human," an actual person who wins by convincing the judges that he is, in fact, a fellow *Homo sapiens* and not a computer. Christian used the preparation for his trip to the competition, as well as his experience there, to dig into the background of the Turing test, the controversies surrounding artificial intelligence, and the scientific and philosophical aspects of language and thought. The result is an amusing and informative tour de force of the field, yet it may leave you scratching your head wondering why all the fuss.

To begin with, as I said, the bar is set pretty low. We have actually had very simple computer programs (like the famous ELIZA, which simulates a talk therapist) that are capable of doing a pretty good job of fooling us into thinking that we are talking to another human (bad news for talk therapists, I suppose). And they do that, unquestionably, without any hint of "understanding," let alone of consciousness. Indeed, the whole Turing test idea strikes me as naively behavioristic in nature. Behaviorism was an approach to experimental psychology championed by the likes of J.B. Watson and B.F. Skinner as a reaction to the excesses of psychoanalysis. Behaviorists decided that talk of internal mental states was unscientific and that all that psychologists can do is study external behavior (which has led to a small cottage industry of jokes about behaviorists asking others what they—the behaviorists—felt in response to this or that). As much as it was probably a necessary corrective to so much unfounded talk of id, ego, and superego, behaviorism has since left the building as a viable theory of psychology (though it remains as a

form of clinical practice). It seems to me that the Turing test should have gone the same way long ago.

The issue, as Christian makes abundantly clear throughout the book, is not whether programmers can devise a clever enough trick that can fool some people some of the time (and for a short period at that) but whether it is possible—or even makes sense to try—to equip computers with something akin to human intelligence and thought. (Please notice that I do not subscribe to non-physicalist views of human consciousness.) This, of course, cannot be achieved by parlor tricks like ELIZA, nor does one come much closer by designing programs like Deep Blue—the one that famously beat world chess champion Garry Kasparov in 1997. Deep Blue was a testimony to human ingenuity, but it wasn't thinking in anything like the way a human being does, despite its impressive speed of information processing and clever algorithms devoted to single-minded excellence at a task.

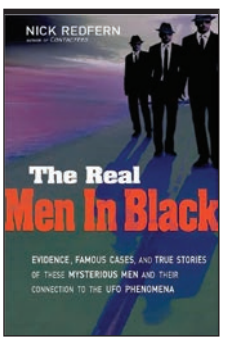
Christian seems convinced that the key to artificial intelligence is to be found in the implications of Shannon's Information Theory, which deals among other things with the compression of semantic content. As Christian puts it at the end of the book, "If a computer could . . . compress English optimally, it'd know enough about the language that it would *know the language*. We'd have to consider it intelligent—in the human sense of the word" (emphasis in the original). Well, in some sense of knowing and intelligence this may be true. But would we have succeeded in creating an artificial intelligence substantially analogous to the human variety? Would that computer be conscious of knowing the English language? There are serious reasons to doubt it. More likely, we would have created something different, and we might need to broaden our very understanding of what "thinking" means. ■

Massimo Pigliucci is professor of philosophy at the Graduate Center of the City University of New York, a fellow of the American Association for the Advancement of Science, and author of *Nonsense on Stilts: How to Tell Science from Bunk*. His essays can be found at www.rationallyspeaking.org.

He Lets Other People Make Up Stories for Him

ROBERT SHEAFFER

A woman living in Cannock Chase in central England was interrupted one day by "a horrible little man" pounding, not knocking, on her door. He warned her to cease her studies of UFOs. In his new book, *The Real Men in Black*, UFO author Nick Redfern explains: "During the day, the Chase is a pleasant and picturesque area of woodland. When night falls, however, it becomes a decidedly unsettling locale that reeks of hard-to-define, ethereal, and surreal foulness"—the "dark domain of UFOs, ghosts, werewolves, Bigfoot-type beasts, and large, black, glowing-eyed cats." Whew! As soon as I read all this purple prose in the book's introduction, I knew we were in for a scary ride. Nowadays the Men in Black (MIB), you see, are not just guys who try to intimidate people into silence after they have had a UFO encounter. Instead they're tied in with all manner


NICK REDFERN
The Real
Men In Black
EVIDENCE, FAMOUS CASES, AND TRUE STORIES
OF THESE MYSTERIOUS MEN AND THEIR
CONNECTION TO THE UFO PHENOMENA

The Real Men in Black. By Nick Redfern. New Page Books, Pompton Plains, New Jersey, 2011. ISBN 978-1-60163-157-2. 256 pp. Paperback, $15.99.

Nowadays the Men in Black (MIB), you see, are not just guys who try to intimidate people into silence after they have had a UFO encounter. Instead they're tied in with all manner of paranormal spooky things…

of paranormal spooky things, including Mothman, the Loch Ness monster, phantom airplanes, night terrors, flying or melting automobiles, and so on *ad absurdum*. People in Redfern's book report all manner of frightening and apparently pointless MIB harassment, and poor Colin Bennett, a prolific British UFOlogist, laments that a visit to his girlfriend's apartment by a mysterious MIB after they had a UFO sighting led her to break up with him.

Theories about the identity of the Men in Black run the gamut from hallucinations and hoaxes to vampires and tulpas (supernatural beings allegedly meditated into existence by high-level Tibetan lamas but which, like Frankenstein's creation, sometimes acquire an agenda of their own). The MIB are also theorized to possibly be time travelers, demonic manifestations, rogue civilian or possibly government investigators, or some sort of trickster or fairy spirit playing a kind of cosmic joke. By the way, there are a few reports of Women in Black, although they are far outnumbered in the traditionally male occupation of UFO witness intimidation.

The book is not entirely drivel, but much of it is. Some interviews with (and quotes from) well-known UFOlogists about the MIB are informative and help set the historical framework for this bizarre aberration of belief. Author Redfern, interviewed about the book by UFO writer James Moseley, said, "I didn't make this stuff up. I let other people make it up for me." After the remark was published Redfern insisted he meant it only in jest, but the comment would not have been funny were it not so obviously true. If you enjoy people recounting delusions of persecution, then *The Real Men in Black* is highly recommended. But if you're like me and you find that sort of thing tedious and annoying, you won't find much of interest here. ■

Robert Sheaffer is a noted UFO skeptic and a SKEPTICAL INQUIRER columnist and contributing editor. His books include *UFO Sightings* (Prometheus Books, 1998) and the just-published *Psychic Vibrations: Skeptical Giggles from the SKEPTICAL INQUIRER*.

[INBOX

Stem Cell Hype | Death of Sai Baba | Chastity Belts | Search for the Emerald Grail | Hume's 'On Miracles'
Skeptical Inquirer
THE MAGAZINE FOR SCIENCE & REASON
CIVILIZATIONS LOST AND FOUND: FABRICATING HISTORY
FIRST OF A THREE-PART SERIES
9/11 Truther Conference
The Haunted Brain: Ghosts on the Mind
Perpetual Motion Devices, Again and Again

Lost Civilizations, Fact and Fantasy

In Part One of "Civilizations Lost and Found: Fabricating History" (SI, September/October 2011) Feder et al. mention the interview with Roger Kennedy in *The Lost Civilizations of North America* documentary but fail to put it into any useful context. Kennedy is the author of *Hidden Cities: The Discovery and Loss of Ancient North American Civilization*, published in 1994 to excellent reviews in, among other places, *The New Yorker*, the *Atlantic Monthly*, the *Boston Globe*, the *Christian Science Monitor*, and *Kirkus Reviews*. He presented the then-startling thesis that failure to investigate, study, and preserve ancient American earthworks reflected a deep-rooted and essentially, if not consciously, racist attitude toward the first Americans and the nature of their civilizations. He discusses *and debunks* attempts to "explain away" the evidence by appeals to mysterious Old World civilizing influences (Chapter 10). I cannot understand why Feder et al. fail to cite this important book, which sets the entire train of modern developments in motion, including the Smoot-Stout-McLerran documentary.

Another more recent best seller, *The Lost City of Z* by David Grann (2005), tells the story of the last intrepid English swashbuckler and explorer, Percy Fawcett, and his idiosyncratic and doomed search for a "lost city" in the Amazon. At the end, Grann reveals that Fawcett was basically right about the "lost city." He was wrong about the material with which it was built. Large-scale Amazonian settlements were earthworks too, and they share many attributes with our own, including astronomical orientation. The notion that the Amazon was a primeval jungle inhabited only by small nomadic tribes of hunter-gatherers who left no footprint has been thoroughly exploded, though people don't know that—including my students in tropical ecology, who are nearly all dumbfounded by it. We now know that the pre-Columbian Amazon supported large numbers of people and their works, and our willingness to recognize their

(remarkably obvious) footprint was systematically blinded by romanticism and racism. The body of relevant evidence has expanded far beyond what was cited by Grann. The stories are strikingly parallel.

While Fawcett may have been a Theosophical crackpot and the mound builders inspiration for all sorts of fantasies and frauds, the fact remains that on both continents both scientists and the general public for far too long failed to see the evidence. That is a valid matter for sociologists and social psychologists to ponder.

Arthur M. Shapiro
Distinguished Professor of Evolution and Ecology
University of California, Davis
amshapiro@ucdavis.edu

Regarding the article "Civilizations Lost and Found: Fabricating History," I strongly agree with the fact that "Most Americans don't know much of anything about Native American cultures." Most indigenous Americans, unfortunately, don't know enough about their own ancestors' migrations into North America either.

Chester Twarog
Hudson, Massachusetts

Kenneth L. Feder, Bradley T. Lepper, Terry A. Barnhart, and Deborah A. Bolnick respond:

Roger Kennedy's book is a well-regarded contribution to the literature concerning the mound builders, but we think Shapiro gives the author too much credit in stating that "He presented the then-startling thesis that failure to investigate, study, and preserve ancient American earthworks reflected a deep-rooted and essentially, if not consciously, racist attitude toward the first Americans and the nature of their civilization." Startling to whom? The thesis is certainly correct, but it was hardly new or "startling" to the archaeological community or to historians who had studied the pervasiveness of racism in American society in the nineteenth and twentieth centuries. Nor was Kennedy the first writer to debunk efforts to "explain away" evidence by appealing to diffusion of cultural influences or colonization. Kennedy builds his arguments in Hidden Cities *upon a literature going back several decades. For example, the first edition of Robert Silverberg's book* Moundbuilders of Ancient America: The Archaeology of a Myth *was published in 1968, and Kennedy's perspective in his* Hidden Cities *was already a central theme in this book published twenty-six years earlier. Silverberg's thesis is featured in Willey and Sabloff's* History of American Archaeology *(first published in 1974) and in Ken Feder's* Frauds, Myths, and Mysteries: Science and Pseudoscience in Archaeology *(first published in 1990).*

Our Debt to Hume

Massimo Pigliucci rightly reminds skeptics of our debt to the Enlightenment thinker and skeptic David Hume ("On Miracles—Again," SI, September/October 2011).

When Hume stated that "a miracle is a violation of the laws of nature," he was not giving a definition of the word *miracle* but merely stating one necessary condition for the application of this concept. Hume's definition is given in a footnote: "A miracle may be accurately defined, as a transgression of a law of nature by a particular volition of the Deity, or by the interposition of some invisible agent." (Enquiry, Sect. 10, part I).

So, according to Hume, there are two necessary conditions for applying the term *miracle* to an event:

1. The event violated a law of nature, and
2. God (or some other spirit) brought about the event.

This makes it even more difficult to establish that a miracle has occurred. One must show that an event violated a law of nature, and one must also show that God (or some other powerful spirit) exists, and then one must show that the event was caused by God (or by some other powerful spirit) as opposed to being caused by a human being (or a space alien) with extraordinary powers.

Because God (as typically conceived) does not have a body, we cannot directly observe the existence or activities of God using our senses, so it is difficult to establish that God exists and even more difficult to establish that some alleged supernatural event was caused by God (or by some other specifically identifiable spirit).

Each of the above two conditions presents a serious difficulty to any effort to show that a miracle has happened, but the requirement that both conditions be satisfied makes it nearly impossible to do so.

Bradley Bowen
Kirkland, Washington

Praiseworthy Editorial

I have been a reader of SI for over twenty years, and seldom have I come across any feedback on the editorials.

The editorial by Kendrick Frazier ("Who Really Wants Reliable Scientific Information?," SI, September/October 2011) is worthy of praise of a very high degree. It struck a note with me as an atheist and rationalist, recalling situations that I encounter quite a few times in a month. The lines elaborating on "confirmation bias" especially exemplify what happens in discussions among theists, proponents of alternative medicine, anti-libertarians, and me.

Aarmin Banaji
dog2on@gmail.com

Chastity Belts

I really liked Massimo Polidoro's article on chastity belts ("The Myth of Chastity Belts," SI, September/October 2011). I always thought there was something fishy about the idea (how was the poor woman supposed to use the bathroom?), but on the other hand there doesn't seem to be any limit to the crazy things people will do when "morals" are at stake. Even though there are big things that need debunking, we have to remember that little things like this mean a lot, too.

Thomas Barefield
Waynesboro, Georgia

Blocking Conspiracy Theories

The July/August 2011 issue of SI discussed "9/11 Conspiracy Theories, Ten Years Later." On 9/12/2011, ten years plus one day after the event, the *New York Times* published an article by Noam Cohen about how Wikipedia's "supreme court of sorts," its arbitration committee, has kept any mention of conspiracy theories out of Wikipedia's main 9/11 article, not even allowing it to be linked (http://www.nytimes.com/2011/09/12/business/media/on-wikipedia-911-dissent-is-kept-on-the-fringe.html).

Though there is an article on Wikipedia entitled "9/11 Conspiracy Theories" that has received millions of page views, Cohen says in the *New York Times*'s article that "not one of those visitors got to the conspiracy theories page by making a hypertext leap from a link in the main article about the Sept. 11 attacks. There is simply no mention of these theories, deemed fringe ideas, which have been repeatedly and officially discredited."

Jay M. Pasachoff
William College
Williamstown, Massachusetts

Hypocritical Believers

I have noticed that many believers in pseudoscience are inconsistent—if not outright hypocritical—in their distrust of science and the scientific method. Many people use a simplified version of the scientific method in their daily lives yet don't think of it as such.

I'll bet that when Sylvia Browne loses her car keys, she says to herself: "Maybe I dropped them in the garage" (formulation of a hypothesis); "Let me go look on the floor of the garage" (testing the hypothesis); "Nope, they are not there" (initial hypothesis has been disproved); "The first place I went to after entering the house was the bathroom; maybe they are there" (second hypothesis); "Let me check the bathroom" (testing the hypothesis); and finally, "Here they are on the counter near the sink!" (validation of hypothesis).

Furthermore, every time we use any of the countless technologies developed as a result of the discoveries of science and are not surprised when they function as they are supposed to, we are declaring our trust in the truth-finding power of science. In many cases we are entrusting our health and our very lives to that power.

I sometimes wonder just how tenaciously a believer in pseudoscience would continue to cling to those beliefs if he were in a situation where he had a high personal stake in discovering the truth.

Gina Patacca
Columbus, Ohio

In the Trenches

While attempting to debate a new acquaintance about his penchant for chiropractic, I was stopped in my tracks by his declaration that my "opinions weren't valid because [I] read them in books." He further insisted that I lacked his real world experience, which supported his various beliefs in the supernatural and alternative medicine. I'm not usually stumped for a rejoinder, but this convinced me that he wasn't going to listen anyway. I'm still wondering what I should have said to him. "Gee, the Bible is a book, isn't it?" might have had some effect, but I doubt it. Just an example of the sort of mind-numbing thankless skirmishes I experience down here in the nonacademic trenches.

Debra Thrall
Sandy Hook, Connecticut

Deliberate Ignorance

Isn't it odd that in the twenty-first century with so many advances in science, technology, and education, ignorance is so prevalent in the United States ("Deliberate Ignorance" by Keith Taylor, SI, July/August 2011)? I commend Taylor for having the journalistic backbone to write so honestly about how ignorance and stupidity is so widespread. Most people wouldn't broach the subject.

I feel that there are several reasons that ignorance is so widespread. Two are pure laziness and the fact that people don't have the time in today's overworked society to really look into issues. It's much easier to let someone else do the thinking for you.

Fundamentalist religion, which is cultism in my opinion, is another factor in American stupidity. It brainwashes people into believing only what they are told and teaches them not to think. A person who is educated or thinks for himself is a danger to religion.

The Republican Party is another factor in the dumbing down of America. It constantly does everything in its power to discourage and inhibit education. Education lets the sun shine in on its snake oil agenda.

Yes, Taylor, you are so right. We are in the process of putting down our education system. We have politicians who denigrate evolution and global warming as if they are better experts than the scientists who study these things. I expect any day now to hear that the Earth is actually flat; if it's said by the right people, thousands will really believe it.

Robert G. Reed
Boyne City, Michigan

Science and Religion

Jim Clark describes the book *The Language of Science and Faith* as "A Flawed Attempt to Reconcile Religion and Science" (SI, September/October 2011).

Science and religion come from entirely different premises. It is erroneous to prove or disprove the one or the other; each case is based on different premises and rationales. Such attempts may be intellectually inviting but are doomed to failure.

Leo Shatin
Retired professor of clinical psychology
Mount Sinai School of Medicine
New York, New York

Dowsing

So, evidence does not support the validity of dowsing ("Dowsing: Dubious and Discredited," SI, September/October 2011). Be that as it may, dowsing serves an important purpose in locating sources of well water. It relieves the landowner from the responsibility of choosing an exact spot to drill. If it turns out to be a "dry hole," he can blame the dowser, not himself.

Joe Callizo
Lower Lake, California

NICE Excellence

The Commentary by James D. Herbert and Richard Redding ("When the Shrinks Ignore Science, Sue Them," SI, September/October 2011) is excellent, but there has never been a British body called the National Institute for Clinical Effectiveness. They presumably mean the body originally set up in 1999 as the National Institute for Clinical Excellence, which since 2005 has been called the National Institute for Health and Clinical Excellence, while still retaining the engaging acronym NICE.

Ray Ward
London, England

[FEEDBACK

The letters column is a forum on matters raised in previous issues. **Letters should be no longer than 225 words.** Due to the volume of letters we receive, not all can be published. Send letters as email text (not attachments) to letters@csicop.org. In the subject line, provide your surname and informative identification, e.g.: "Smith Letter on Jones evolution article." Include your name and address at the end of the letter. You may also mail your letter to the editor to 944 Deer Dr. NE, Albuquerque, NM 87122, or fax it to 505-828-2080.

Find us on: facebook

Cause Page: Committee for Skeptical Inquiry/Skeptical Inquirer magazine

Fan Page: Skeptical Inquirer

[THE LAST LAUGH

BENJAMIN RADFORD

HIDDEN MESSAGES by Dave Thomas

The following letters are a simple substitution cipher. If R stands for L, it will do so everywhere. Solution is by trial and error. Hint: Look for patterns in words; for example, the scrambled phrase "JRXJ JRQ" might represent "THAT THE."

PUZZLE

"BD BC GLLXL XHIJ, EHZ HXD DLQDS, DSED CSLBHFC NLXA BHVQBLJ."—DSXAEC WEBHG

CLUE: Z = D

ANSWER KEY

As you decipher letters, keep track of them with the handy answer key below. If you've decided that R stands for L, simply write down an "L" above or below the "R" in the alphabetized row below, just as you would for the cipher itself. This builds a handy, easy-to-use reference guide for you and will also reveal the "Super Secret Word," a puzzle within a puzzle!

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

PREVIOUS PUZZLE SOLUTION (November/December 2011):
"WITHOUT DEVIATION FROM THE NORM, PROGRESS IS NOT POSSIBLE."
—FRANK ZAPPA

SUPER-SECRET WORD: MISANTHROPE
(Instructions: www.nmsr.org/secretword.htm)

Hidden Messages Puzzle Contest

Submit your solution by email to bradford@centerforinquiry.net or via postal mail to: Benjamin Radford The Last Laugh P.O. Box 3016 Corrales, NM 87048
Winner will be chosen at random from the first three correct submissions received by both e-mail and postal mail.

SKEPTICAL ANNIVERSARIES

by Tim Farley

January 19, 2007: Young Earth creationist Kent Hovind was sentenced to ten years in prison on fifty-eight federal charges.

January 19, 2007: Anderson Cooper covered convicted felon Sylvia Browne's bungling of the Shawn Hornbeck abduction case; James Randi and Robert S. Lancaster appeared on the program.

February 10, 1947: The last of Oliver Joseph Lodge's secret messages was opened after his death. No spirit medium had succeeded in identifying any of them.

February 25, 1942: Artillery fire in Los Angeles during World War II that gave rise (decades later) to claims that the target was an extraterrestrial UFO.

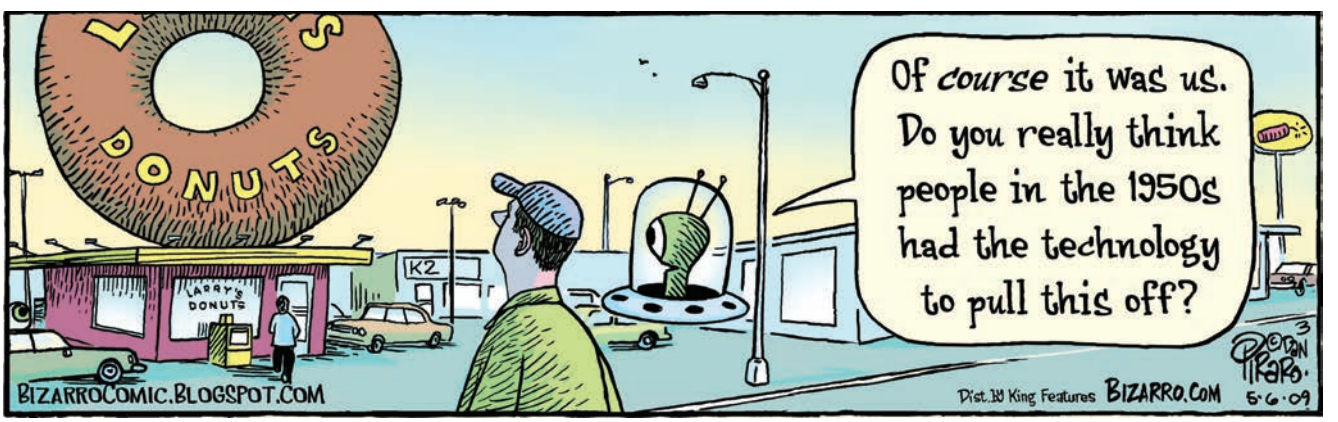
February 26, 1998: Andrew Wakefield, MD, creates the "vaccines cause autism" hysteria in a press conference about his research that was called "fraudulent" by the British Medical Journal in 2011.

Tim Farley is a research fellow with the James Randi Educational Foundation and created the website whatstheharm.net.

November/December 2011 Hidden Messages Puzzle Contest Winner:
Joan MacNeill

This issue's prize: an autographed copy of skeptic musician George Hrab's CD Minutiae, featuring the hits "Ockham's Shaving Kit" and "Stigmata" (which remains big in Japan).

BIZARRO


DONUTS
LARRY'S DONUTS
K2
Of course it was us. Do you really think people in the 1950s had the technology to pull this off?
BIZARROCOMIC.BLOGSPOT.COM
Dist. by King Features BIZARRO.COM
5·6·09

Bizarro (New)©2009 Dan Piraro King Features Syndicate

Committee for Skeptical Inquiry

Scientific and Technical Consultants

Gary Bauslaugh,
writer and editor,
Victoria, B.C., Canada

Richard E. Berendzen,
astronomer, Washington, DC

Martin Bridgstock,
senior lecturer, School of Science,
Griffith Univ., Brisbane, Australia

Richard Busch,
magician/mentalist, Pittsburgh, PA

Shawn Carlson,
Society for Amateur Scientists,
East Greenwich, RI

Roger B. Culver,
prof. of astronomy, Colorado State Univ.

Felix Ares de Blas,
prof. of computer science,
Univ. of Basque, San Sebastian, Spain

J. Dommanget,
astronomer, Royale Observatory,
Brussels, Belgium

Nahum J. Duker,
assistant prof. of pathology,
Temple Univ.

Taner Edis,
Division of Science/Physics
Truman State Univ.

Barbara Eisenstadt,
psychologist, educator, clinician,
East Greenbush, NY

William Evans,
prof. of communication,
Center for Creative Media

Bryan Farha,
prof. of behavioral studies in
education, Oklahoma City Univ.

John F. Fischer,
forensic analyst, Orlando, FL

Eileen Gambrill,
prof. of social welfare,
Univ. of California at Berkeley

Luis Alfonso Gámez,
science journalist, Bilbao, Spain

Sylvio Garattini,
director, Mario Negri Pharmacology
Institute, Milan, Italy

Laurie Godfrey,
anthropologist, Univ. of Massachusetts

Gerald Goldin,
mathematician, Rutgers Univ., NJ

Donald Goldsmith,
astronomer; president, Interstellar Media

Alan Hale,
astronomer, Southwest Institute for Space
Research, Alamogordo, NM

Clyde F. Herreid,
prof. of biology, SUNY Buffalo

Terence M. Hines,
prof. of psychology,
Pace Univ., Pleasantville, NY

Michael Hutchinson,
author; Skeptical Inquirer
representative, Europe

Philip A. Ianna,
assoc. prof. of astronomy,
Univ. of Virginia

William Jarvis,
prof. of health promotion and public health,
Loma Linda Univ., School of Public Health

I.W. Kelly,
prof. of psychology, Univ. of Saskatchewan,
Canada

Richard H. Lange,
MD, Mohawk Valley Physician
Health Plan, Schenectady, NY

Gerald A. Larue,
prof. of biblical history and
archaeology, Univ. of So. California

William M. London,
California State Univ., Los Angeles

Rebecca Long,
nuclear engineer, president of Georgia
Council Against Health Fraud, Atlanta, GA

Thomas R. McDonough,
lecturer in engineering, Caltech, and SETI
Coordinator of the Planetary Society

James E. McGaha,
astronomer, USAF pilot (ret.)

Chris Mooney,
journalist, author, host of *Point of Inquiry*

Joel A. Moskowitz,
director of medical psychiatry, Calabasas
Mental Health Services, Los Angeles

Matthew C. Nisbet,
assistant professor, School of
Communication, American Univ.

John W. Patterson,
prof. of materials science and
engineering, Iowa State Univ.

James R. Pomerantz,
prof. of psychology, Rice Univ.

Gary P. Posner,
MD, Tampa, FL

Daisie Radner,
prof. of philosophy, SUNY Buffalo

Robert H. Romer,
prof. of physics, Amherst College

Karl Sabbagh,
journalist, Richmond, Surrey, England

Robert J. Samp,
assistant prof. of education and
medicine, Univ. of Wisconsin-Madison

Steven D. Schafersman,
asst. prof. of geology, Miami Univ., OH

Chris Scott,
statistician, London, England

Stuart D. Scott, Jr.,
associate prof. of anthropology,
SUNY Buffalo

Erwin M. Segal,
prof. of psychology, SUNY Buffalo

Carla Selby,
anthropologist / archaeologist

Steven N. Shore,
prof. of astrophysics, Univ. of Pisa, Italy

Waclaw Szybalski,
professor, McArdle Laboratory, Univ.
of Wisconsin-Madison

Sarah G. Thomason,
prof. of linguistics, Univ. of Pittsburgh, PA

Tim Trachet,
journalist and science writer, honorary
chairman of SKEPP, Belgium

David Willey,
physics instructor, Univ. of Pittsburgh, PA

Affiliated Organizations | United States

ALABAMA

Alabama Skeptics, Alabama. Emory Kimbrough. Tel.: 205-759-2624. 3550 Watermelon Road, Apt. 28A, Northport, AL 35476

ARIZONA

Tucson Skeptics Inc. Tucson, AZ. James McGaha. Email:mcgaha@skepticus.com. 5100 N. Sabino Foothills Dr., Tucson, AZ 85715

Phoenix Area Skeptics Society (PASS) http://phoenixskeptics.org Email: phoenixskeptics@gmail.com

Phoenix Skeptics, Phoenix, AZ. Michael Stackpole, P.O. Box 60333, Phoenix, AZ 85082

CALIFORNIA

Sacramento Organization for Rational Thinking (SORT) Sacramento, CA. Ray Spangenburg, co-founder. Tel.: 916-978-0321; Email: kitray2@comcast.net. PO Box 2215, Carmichael, CA 95609-2215 http://home.comcast.net/~kitray2/site/

Bay Area Skeptics (BAS) San Francisco–Bay Area. Eugenie C. Scott, President. 1218 Miluia St., Berkeley, CA 94709. Email: scott@ncse.com. www.BASkeptics.org

Independent Investigations Group (IIG), Center for Inquiry–*West*, 4773 Hollywood Blvd, Los Angeles, CA 90027. Tel.: 323-666-9797. www.iigwest.com

Sacramento Skeptics Society, Sacramento. Terry Sandbek, President. 4300 Auburn Blvd. Suite 206, Sacramento CA 95841. Tel.: 916 489-1774. Email: terry@sandbek.com

San Diego Association for Rational Inquiry (SDARI) President: Paul Wenger. Tel.: 858-292-5635. Program/general information 619-421-5844. www.sdari.org. Postal address: PO Box 623, La Jolla, CA 92038-0623

COLORADO

The Denver Skeptics Meetup Group Elaine Gilman, President. Skype address: elaine.gilman. 965 S. Miller Street, 302, Lakewood, CO 80226. http://skeptics.meetup.com/131/

CONNECTICUT

New England Skeptical Society (NESS) New England. Steven Novella M.D., President. Tel.: 203-281-6277; Email: board@theness.com. 64 Cobblestone Dr., Hamden, CT 06518 www.theness.com

D.C./MARYLAND

National Capital Area Skeptics NCAS, Maryland, D.C., Virginia. D.W. "Chip" Denman. Tel.: 301-587-3827. Email: ncas@ncas.org. PO Box 8428, Silver Spring, MD 20907-8428 http://www.ncas.org

FLORIDA

Tampa Bay Skeptics (TBS) Tampa Bay, Florida. Gary Posner, Executive Director. Tel.: 813-849-7571; Email: tbs@centerforinquiry.net. c/o O'Keefe, 4011 S. Manhattan Ave. #139, Tampa, FL 33611-1277. www.tampabayskeptics.org

The James Randi Educational Foundation. James Randi, Director. Tel: (954)467-1112; Email jref@randi.org. 201 S.E. 12th St. (E. Davie Blvd.), Fort Lauderdale, FL 33316-1815. www.randi.org

ILLINOIS

Rational Examination Association of Lincoln Land (REALL) Illinois. Bob Ladendorf, Chairman. Tel.: 217-546-3475; Email: chairman@reall.org. PO Box 20302, Springfield, IL 62708 www.reall.org

Chicago Skeptics Jennifer Newport, contact person. Email: chicagoskeptics@gmail.com. www.chicagoskeptics.com

KENTUCKY

Kentucky Assn. of Science Educators and Skeptics (KASES) Kentucky. 880 Albany Road, Lexington, KY 40502. Contact Fred Bach at Email: fredwbach@yahoo.com; www.kases.org; or (859) 276-3343

LOUISIANA

Baton Rouge Proponents of Rational Inquiry and Scientific Methods (BR-PRISM) Louisiana. Marge Schroth. Tel.: 225-766-4747. 425 Carriage Way, Baton Rouge, LA 70808

MICHIGAN

Great Lakes Skeptics (GLS) SE Michigan. Lorna J. Simmons, Contact person. Tel.: 734-525-5731; Email: Skeptic31@aol.com. 31710 Cowan Road, Apt. 103, Westland, MI 48185-2366

Tri-Cities Skeptics, Michigan. Gary Barker. Tel.: 517-799-4502; Email: barkerg@svol.org. 3596 Butternut St., Saginaw, MI 48604

MINNESOTA

St. Kloud Extraordinary Claim Psychic Teaching Investigating Community (SKEPTIC) St. Cloud, Minnesota. Jerry Mertens. Tel.: 320-255-2138; Email: gmertens@stcloudstate.edu. Jerry Mertens, Psychology Department, 720 4th Ave. S, St. Cloud State Univ., St. Cloud, MN 56301

MISSOURI

Skeptical Society of St. Louis (SSSL) St. Louis, Missouri. Michael Blanford, President. Email: info@skepticalstl.org. 2729 Ann Ave., St. Louis, MO 63104 www.skepticalstl.org

St. Joseph Skeptics P.O. Box 8908 St. Joseph MO, 64508-8908

NEVADA

Skeptics of Las Vegas, (SOLV) PO Box 531323, Henderson, NV 89053-1323. Email: rbanderson@skepticslv.org www.skepticslv.org

NEW MEXICO

New Mexicans for Science and Reason (NMSR) New Mexico. David E. Thomas, President. Tel.: 505-869-9250; Email: nmsrdave@swcp.com. PO Box 1017, Peralta, NM 87042. www.nmsr.org

NEW YORK

New York City Skeptics Michael Feldman, president. PO Box 5122 New York, NY 10185. www.nycskeptics.org

Inquiring Skeptics of Upper New York (ISUNY) Upper New York. Michael Sofka, 8 Providence St., Albany, NY 12203

Central New York Skeptics (CNY Skeptics) Syracuse. Lisa Goodlin, President. Tel: (315) 446-3068; Email: info@cnyskeptics.org, cnyskeptics.org 201 Milnor Ave., Syracuse, NY 13224

OHIO

Central Ohioans for Rational Inquiry (CORI) Central Ohio. Charlie Hazlett, President. Tel.: 614-878-2742; Email: charlie@hazlett.net. PO Box 282069, Columbus, OH 43228

South Shore Skeptics (SSS) Cleveland and counties. Jim Kutz. Tel.: 440 942-5543; Email: jimkutz@earthlink.net. PO Box 5083, Cleveland, OH 44101 www.southshoreskeptics.org

Association for Rational Thought (ART) Cincinnati. Roy Auerbach, president. Tel: (513)-731-2774, Email: raa@cinci.rr.com. PO Box 12896, Cincinnati, OH 45212. www.cincinnatiskeptics.org

OREGON

Oregonians for Science and Reason (OASR) Oregon. Jeanine DeNoma, president. Tel.: (541) 745-5026; Email: wilkinsa@peak.org; 39105 Military Rd., Monmouth, OR 97361. www.04SR.org

PENNSYLVANIA

Philadelphia Association for Critical Thinking (PhACT), much of Pennsylvania. Eric Krieg, President. Tel.: 215-885-2089; Email: erickrieg@verizon.net. By mail c/o Ray Haupt, 639 W. Ellet St., Philadelphia PA 19119

TENNESSEE

Rationalists of East Tennessee, East Tennessee. Carl Ledenbecker. Tel.: (865)-982-8687; Email: Aletall@aol.com. 2123 Stonybrook Rd., Louisville, TN 37777

TEXAS

North Texas Skeptics NTS Dallas/Ft Worth area, John Blanton, Secretary. Tel.: (972)-306-3187; Email: skeptic@ntskeptics.org. PO Box 111794, Carrollton, TX 75011-1794. www.ntskeptics.org

VIRGINIA

Science & Reason, Hampton Rds., Virginia. Lawrence Weinstein, Old Dominion Univ.-Physics Dept., Norfolk, VA 23529

WASHINGTON

Society for Sensible Explanations, Western Washington. Tad Cook, Secretary. Email: K7RA@arrl.net. PO Box 45792, Seattle, WA 98145-0792 US. http://seattleskeptics.org

PUERTO RICO

Sociedad De Escépticos de Puerto Rico, Luis R. Ramos, President. 2505 Parque Terra Linda, Trujillo Alto, Puerto Rico 00976. Tel: 787-396-2395; Email: Lramos@escepticospr.com; www.escepticor.com

The organizations listed above have aims similar to those of the Committee for Skeptical Inquiry but are independent and autonomous.
Representatives of these organizations cannot speak on behalf of CSI. Please send updates to Barry Karr, P.O. Box 703, Amherst NY 14226-0703.
International affiliated organizations listed at www.csicop.org

CENTERS FOR INQUIRY

www.centerforinquiry.net/about/centers

Transnational
3965 Rensch Road, Amherst, NY 14228
Tel.: (716) 636-4869

Austin
PO Box 202164, Austin, TX 78720-2164
Tel.: (512) 919-4115

Chicago
PO Box 7951, Chicago, IL 60680-7951
Tel.: (312) 226-0420

Indianapolis
350 Canal Walk, Suite A, Indianapolis, IN 46202
Tel.: (317) 423-0710

Michigan
3777 49th Street SE, Grand Rapids, MI 49512
Tel.: (616) 698-2342

New York City
PO Box 26241, Brooklyn, NY 11202
Tel.: (347) 987-3739

San Francisco
email: sf@centerforinquiry.net

Tampa Bay
4011 S. Manhattan Ave. #139, Tampa, FL 33611-1277
Tel.: (813) 849-7571

Washington, DC
621 Pennsylvania Ave. SE, Washington, DC 20003
Tel.: (202) 546-2330

West
4773 Hollywood Blvd., Hollywood, CA 90027
Tel.: (323) 666-9797

Argentina
Av. Santa Fe 1145 - 2do piso, (C1059ABF)
Buenos Aires, Argentina
Tel.: +54-11-4811-1858

Canada
216 Beverley Street, Toronto, Ontario M5T 1Z3,
Canada. Tel.: (416) 971-5676

China
China Research Institute for Science Popularization,
NO. 86, Xueyuan Nanlu Haidian Dist., Beijing,
100081 China
Tel.: +86-10-62170515

Egypt
44 Gol Gamal St., Agouza, Giza, Egypt

France
Dr. Henri Broch, Universite of Nice, Faculte des
Sciences, Parc Valrose, 06108, Nice cedex 2,
France Tel.: +33-492-07-63-12

Germany
Kirchgasse 4, 64380 Rossdorf, Germany
Tel.: +49-6154-695023

India
A 60 Journalist colony, JubileeHills,
Hyderabad-500033, India
Tel.: +91-40-23540676

London
Conway Hall, 25 Red Lion Square,
London WC1R 4RL, England
email: slalvani@centerforinquiry.net

Nepal
Humanist Association of Nepal,
PO Box 5284, Kathmandu Nepal
Tel.: +977-1-4413-345

New Zealand
email: bcooke@centerforinquiry.net

Nigeria
PO Box 25269, Mapo, Ibadan, Oyo State, Nigeria
Tel.: +234-2-2313699

Peru
D. Casanova 430, Lima 14, Peru
email: cipsiperu@yahoo.com

Poland
Lokal Biurowy No. 8, 8 Sapiezynska Sr.,
00-215, Warsaw, Poland

Romania
Fundatia Centrul pentru Constiinta Critica
Tel.: (40)-(0)744-67-67-94
email: CenterforInquiry.Romania@gmail.com

Russia
Dr. Valerii A. Kuvakin, 119899 Russia, Moscow,
Vorobevy Gory, Moscow State Univ.,
Philosophy Department

Senegal
PO Box 15376, Dakar – Fann, Senegal
Tel.: +221-501-13-00